JULY, 1947

NO. 1

VOL. 31

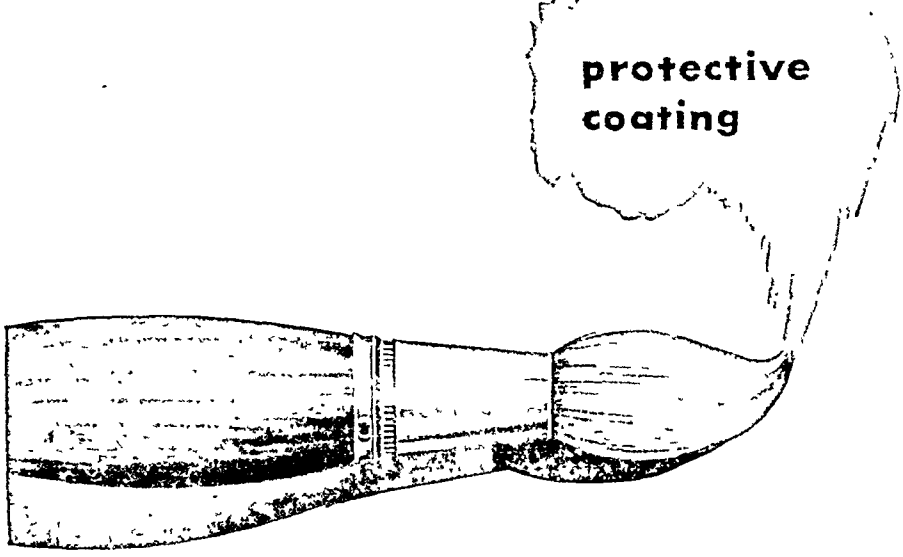
THE JOURNAL OF PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE PROBLEMS AND DISEASES OF INFANCY AND CHILDHOOD

BORDEN S. VEEDER
St. Louis
Editor

Published by THE C. V. MOSBY COMPANY, 3207 Washington Blvd., St. Louis 3, U.S.A.
Copyright 1947 By The C. V. Mosby Company

Table of Contents on 3rd Cover



PECTOCEL

(Pectin and Kaolin Compound, Lilly)

'Pectocel' is a nonchalky, attractive kaolin mixture with a creamy, heavy-bodied smoothness. This preparation has considerable appeal to the patient. The ample kaolin content functions as an adsorptive and effectively produces a protective coating that soothes inflamed intestinal mucosa.

'Pectocel' is indicated for the supportive treatment of diarrhea and inflammation associated with enteritis, gastritis, colitis, and other intestinal infections or intoxications.

Formula:

An aromatized aqueous suspension containing in one fluid ounce:

Pectin	4 1/2 grs.
Kaolin	90 grs.
Zinc Phenolsulfonate	1 1/8 grs.

'Pectocel' is available at pharmacies everywhere.

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U. S. A.

Vol. 31, No. 1, July, 1947. The Journal of Pediatrics is published Monthly by The C. V. Mosby Company, [illegible] d., St. Louis 3, Mo. Subscription price: United States, its possessions, Pan [illegible] $8.50 a year; Canada, $10.00 (Canadian Currency); Foreign, $9.50. Entered as [illegible] June 29, 1912, at the Post Office at St. Louis, Missouri, under the Act of Mar[illegible] the U. S. A.



The Unseen Quality of DEXTRI-MALTOSE

DEXTRI-MALTOSE is no ordinary carbohydrate. Step by step, its manufacture is surrounded with every care and precaution, evolved through long years of experience and research. Unseen by physician and patient are numerous safety factors, the practical effect of which nevertheless is present in every package of Dextri-Maltose. To name a few of these:

1. Dextri-Maltose is sampled for bacteriological testing before drying.
2. Steam under pressure sterilizes Dextri-Maltose filter presses which remove proteins, fat, and indigestible residue.
3. Blood agar tests are made to insure absence of hemolytic cocci.
4. Bacteriological tests are made in a steam-washed plating room, the air of which is filtered.
5. Dextri-Maltose containers are automatically filled and closed without human handling of the product.
6. The direct microscopic test which Dextri-Maltose receives is but one microbiological test which it must routinely meet.
7. The interiors of the large converters in which Dextri-Maltose is processed are thoroughly scrubbed prior to steam sterilization.
8. Steaming under pressure sterilizes the converters for processing Dextri-Maltose.
9. After being packaged, Dextri-Maltose is held in storage and released only after final approval from the bacteriological checking laboratory.
10. Portable equipment used in manufacturing Dextri-Maltose is sterilized in autoclaves under steam pressure.
11. Dextri-Maltose is tested routinely to check the keeping quality of prepared feedings held in refrigeration for 24 hours.

It is, therefore, no mere coincidence that Dextri-Maltose enjoys greater pediatric acceptance today than ever before. By constant research and everlasting watchfulness, we try to keep pace with pediatric progress, and we put forth every human effort to merit the continued respect and confidence of the medical profession.

The True Measure of Economy Is Value

SANITARY CONTROL OF DEXTRI-MALTOSE
No. 7 OF A SERIES

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons. Mead Johnson & Company, Evansville 21, Indiana, U. S. A.

"Nutrition in its broadest sense is the most important branch of pediatrics."

"The Successful Feeding Of Infants . . ."

Excerpts from
"HOLT'S DISEASES OF INFANCY AND CHILDHOOD"
by Holt and McIntosh
D. Appleton-Century Co., New York (Eleventh Edition)

"THE SUCCESSFUL FEEDING of infants . . . demands that the nutritional requirements be met and that the food be suited to the digestion... Simplicity in the preparation of the feeding is much to be desired; the opportunity for error is thereby minimized." (*page 190*)

"When the infant's appetite ceases to be satisfied by 30 or 32 ounces of the standard formula, new food may be added. Cereals, vegetables, fruits, egg, breadstuffs and meats are gradually introduced until by the end of the first year the diet is quite a varied one. It is not possible to specify a particular age at which the addition of so-called solid food should be commenced. If this is postponed until the latter part of the first year, nutritional anemia is liable to develop, and eventual weaning from the bottle may be decidedly difficult; the early use of a varied diet has an educational as well as a nutritional aspect." (*page 210*)

These main-dish baby foods combine all the vegetables, all the meat Baby needs

These five strained combination foods are valuable supplements to milk in infant feeding. They meet all an infant's nutritional requirements for vegetables *and* meat. In them, a number of essential food elements may be fed simultaneously in a main-dish food.

These soups are prepared to *taste good*. It is necessary merely to warm and feed each soup as a main dish for a baby's meals, no other meats or vegetables being required. These soups are smooth, uniform, and bland, and may be started as early as any strained foods. For a chart showing ingredients and a dietetic analysis of each soup, write: Campbell Soup Company, Camden, N. J.



5 KINDS:
CHICKEN
BEEF
LAMB
LIVER
VEGETABLE

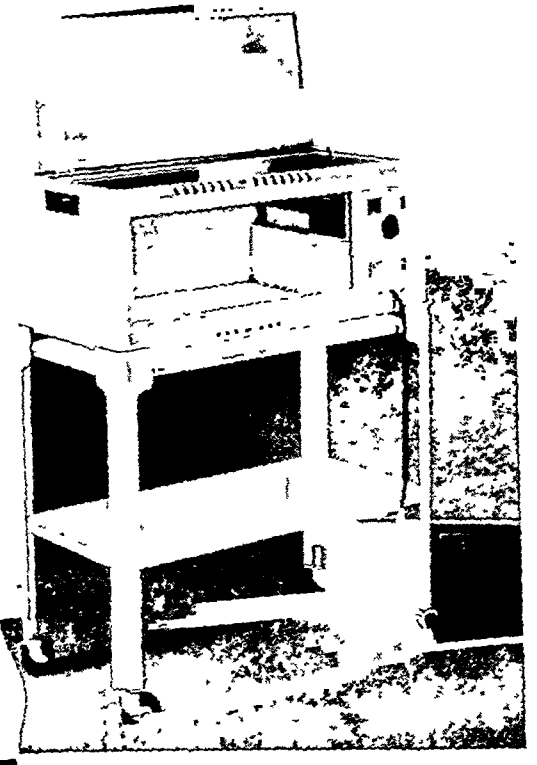
Every grocer who sells Campbell's Soups can supply Campbell's Baby Soups

ARMSTRONG X-4 PORTABLE BABY INCUBATOR

LOW COST

SIMPLE

SAFE



The Armstrong X-4 Baby Incubator is the only Baby Incubator tested and approved by Underwriters' Laboratories for use with oxygen

Low cost • Underwriter approved • Simple to operate • Only 1 control dial • Safe, low-cost, heat • Easy to clean • Quiet and easy to move • Excellent oxygen tent • Fireproof construction • Ball-bearing, soft rubber casters • Welded steel construction • 3-ply safety glass • Full length view of baby • Simple outside oxygen connection • Night light over control • Automatic control • Safe locking ventilator • Safety locked top lid • Both F. and C. thermometer scales • Low operating cost • No special service parts

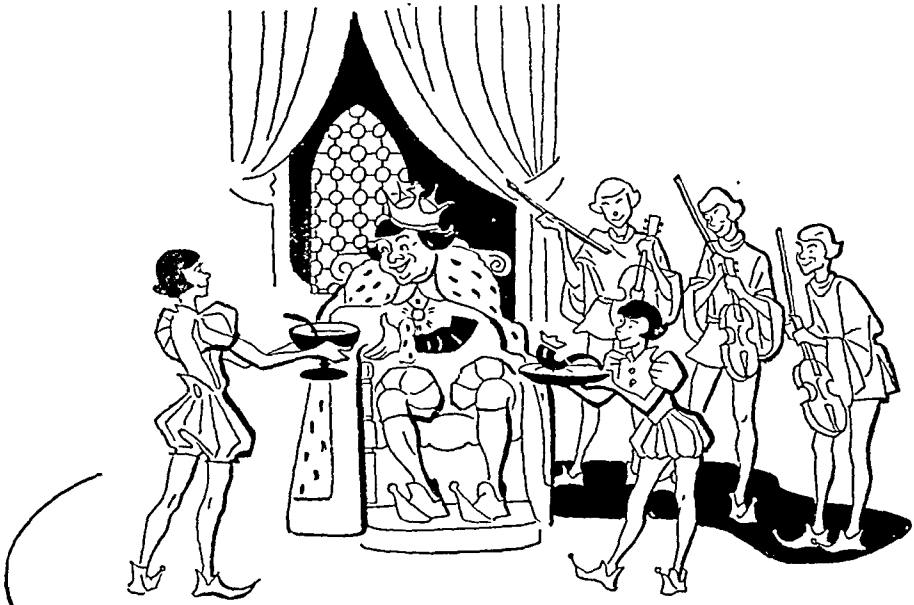
Write for detailed descriptive bulletin

THE GORDON ARMSTRONG COMPANY

Division PP-1 • Bulkley Building • Cleveland 15, Ohio

Distributed in Canada by INGRAM & BELL, LTD. • TORONTO • MONTREAL • WINNIPEG • CALGARY • VANCOUVER

Distributed in Latin America by GENERAL ELECTRIC MEDICAL PRODUCTS CO. • CHICAGO 3, ILLINOIS



"...NONE SO RARE, AS CAN COMPARE"

As merrily as the old King, children call for Vi-Daylin—the very palatable, multiple-vitamin liquid preparation. They enjoy the sweet, toothsome, citrus fruit-like flavor and the small liquid servings. Such a pleasant taste and so easy to swallow, it's little wonder they ask for Vi-Daylin. Once a day is enough for the average child, it is so concentrated. A teaspoonful (5 cc.) of Vi-Daylin supplies twice the minimum daily requirements for a child up to 12 years of age for vitamins D and C and thiamine, and the full minimum daily requirements of vitamin A and riboflavin, and the recommended daily allowance of nicotinamide. Being virtually free of alcohol (less than 0.5%), it is suitable for infants, too, as it mixes readily with milk and other foods. Mothers appreciate the convenient bottle-to-spoon administration, and the economy of small doses of all the more important vitamins in a single preparation. Delight your little patients, and their mothers, too, and have the over-all assurance of adequate protection . . . on your next prescription, *specify* Vi-Daylin. Available in prescription pharmacies everywhere, in bottles of 90 cc. and one pint.
ABBOTT LABORATORIES, North Chicago, Illinois.

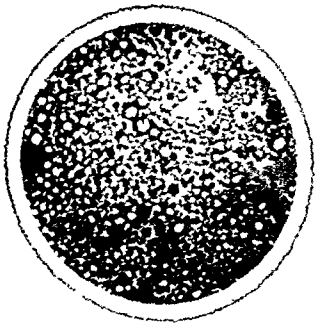
SPECIFY: **VI-DAYLIN** TRADE MARK Vitamins A, B_1, C, D, Riboflavin and Nicotinamide in a palatable liquid form

NEW LOTION CARE FOR SUMMER INFANTS BRINGS SHARP DROP IN MILIARIA

In hospital nurseries, the hot-weather incidence of miliaria has sometimes been as high as 50%.

This miliaria, often leading to more serious secondary infections, has been considered almost inevitable. But when new Johnson's Baby Lotion is used for routine infant skin care, cases of miliaria take a sharp drop.

In recent hospital tests, hundreds of newborns received the protection of smooth, white, antiseptic Lotion during months of June, July, August. Not only was there no customary seasonal rise in miliaria, but incidence remained far below the former year-round average.



Discontinuous film of Johnson's Baby Lotion, showing micron-size oil globules (1000x)

Johnson's Baby Lotion is a homogenized emulsion of pure selected mineral oil and water, with lanolin and an antiseptic added.



Following application to the infant's skin, the water phase of the Lotion evaporates, leaving a discontinuous film of micron-size oil globules.

This permits normal heat radiation and allows perspiration to escape readily, thus lessening the danger of irritation.



JOHNSON'S BABY LOTION

ANTISEPTIC

Johnson & Johnson

FREE! Mail coupon for 12 distribution samples!

2116 72 472 77.33

les due to histamine induced spasm of smooth muscle

dryl

drochloride

IT 32, MICHIGAN

Sweetose*

Ideal carbohydrate supplement for infant feeding formulas

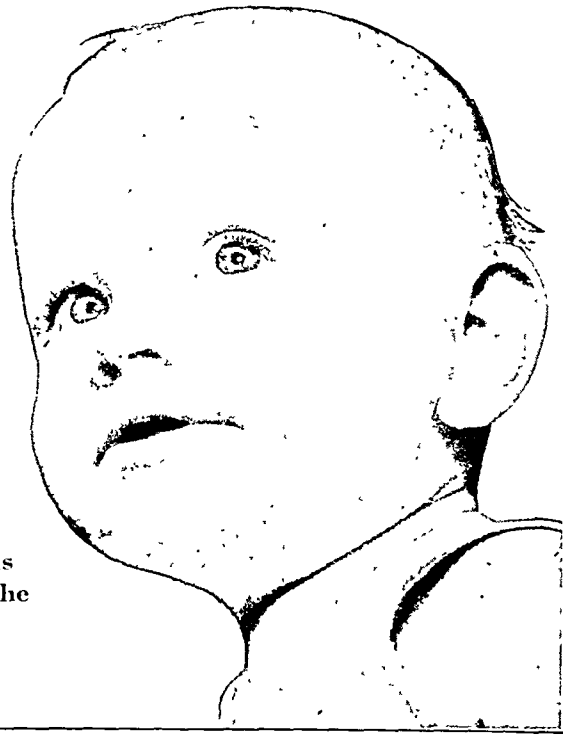
Quickly soluble

•

Readily digestible

Extra rich in dextrose and maltose, Sweetose offers unusual nutritional advantages in infant feeding formulas. Sweetose provides substantially higher amounts of both dextrose and maltose, in contrast to ordinary corn syrups. The possibility of gastrointestinal irritation is greatly minimized by the use of Sweetose.

Write for further details



* 'Sweetose' is a trade-mark of the A. E. Staley Mfg. Co., Decatur Illinois, registered in the U. S. Pat. Off.

A. E. Staley Mfg. Co.

Box 1091, DECATUR, ILLINOIS



	Representative Analysis of Sweetose White Syrup	Representative Analysis of Ordinary Corn Syrup
Moisture	25.2	26.6
Dextrose	28.0	14.7
Maltose	25.5	13.9
Higher Sugars	12.0	13.6
Dextrines	9.1	24.8
Sucrose	0.0	6.2
Ash	0.2	0.2
Available Carbohydrates	74.6	73.2
Calories per fluid oz.	120.0	118.5

No added flavoring or salt.



WE GO FOR YOU!

YES SIR! We may be triplets to the layman—we call her Mother—but we're glad we're individuals to you. For everyone of us rates a different formula . . . different treatment.

But we want to thank you, too, for the one thing we all have in common . . . those Davol "Anti-Colic" brand nipples that copy nature.



WE LIKE THEIR DESIGN which is similar to that of the maternal nipple because of the short tip and firm, reinforced shoulder.

WE LIKE THEIR ACTION. They help promote vigorous, mouth-forming sucking action.





WE LIKE THEIR TIMING because they help us get a full 20 minutes essential exercise every feeding.

And all of us babies go for you, too!

P. S. Have you heard the glad news? Davol nursing-bottle caps are back to keep prepared formulas sterile!



DAVOL

DAVOL RUBBER COMPANY
PROVIDENCE 2
RHODE ISLAND

Davol Rubber Company
Providence 2, Rhode Island
Dept. JP7-7
Gentlemen: Please send me a complimentary copy of the treatise, BOTTLE FEEDING IN RELATION TO INFANTILE COLIC AND MALFORMATION OF THE MOUTH. It's written for physicians by a physician—has 17 illustrations, including 6 anatomical drawings.



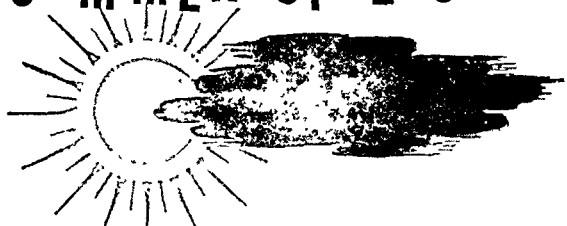
NAME

ADDRESS

CITY

STATE

SUMMER UPSETS



Changes of diet and of daily living routines during the summer months are prominent factors in the etiology of such intestinal upsets as constipation or diarrhea with constipational sequelae.

NEO-CULTOL* offers a physiological means of restoring normal intestinal function in cases where stasis is present. It acts by implanting a viable, aciduric culture of Lactobacillus acidophilus which counteracts putrefactive processes. • Gently lubricating • Palatable • Non-habit-forming • Melting point adjusted to prevent leakage.

SUPPLIED: In jars containing 6 oz.



NEO-CULTOL

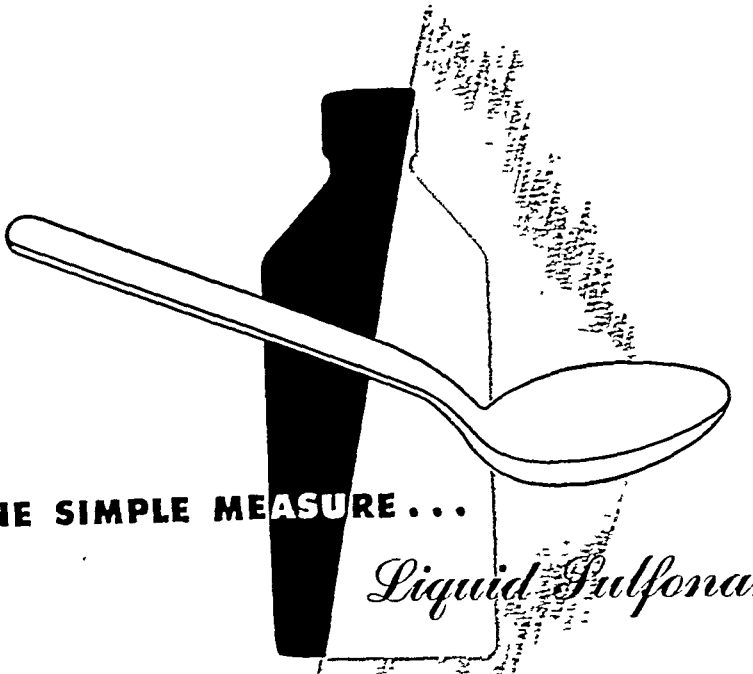
REG. U.S. PAT. OFF.

Lactobacillus acidophilus in a refined mineral oil jelly. Chocolate Flavored.

THE ARLINGTON CHEMICAL COMPANY

YONKERS 1 Arlington NEW YORK

* The word NEO-CULTOL is a registered trademark of The Arlington Chemical Company.



N ONE SIMPLE MEASURE . . .

Liquid Sulfonamides

- **GLUCO-SULFADIAZINE**
- **GLUCO-SULFAMERAZINE**
- **GLUCO-SULFATHIAZOLE**
- **GLUCO-SULFANILAMIDE**

Donley-Evans' Gluco-Sulfonamides — the original highly stable, liquid sulfa drugs for oral use containing Sodium Lactate. Outstanding advantages of these Gluco-Sulfonamides are:

buffered solubility . . . Clinical studies demonstrate that sodium lactate is an effective means of alkalinizing the system during sulfonamide therapy, preventing renal complications and crystalluria (Gilligan, D. R., Garb, S., Wheeler, C., and Plummer, N.: J.A.M.A. 122: 1160, Aug. 21, 1943).

higher blood concentration . . . More rapid absorption is obtained when the drug is given as the solution than when administered in equivalent dosage in tablet form (Siebert, W. J., and Loose, F.: J. Lab. and Clin. Med. 26: November, 1940).

positive dosage . . . Stability eliminates dangers of overdosing or underdosing. Exceptional palatability and ease in administration facilitate sulfonamide therapy, especially in infants and children or adults who object to tablet medication.

Available in six ounce and pint bottles. Literature and sample on request.

DONLEY-EVANS & COMPANY
SAINT LOUIS 20, MISSOURI

Why do Tom, Dick and Harry need Vitamin D ?



Growing children require vitamin D mainly to prevent rickets. They also need vitamin D, though to a lesser degree, to insure optimal development of muscles and other soft tissues containing considerable amounts of phosphorus.

Milk is the logical menstruum for administering vitamin D to growing children, as well as to infants, pregnant women and lactating mothers. This suggests the use of Drisdol in Propylene Glycol, which diffuses uniformly in milk, fruit juices and other fluids

Average daily dose for infants 2 drops, for children and adults 4 to 6 drops, in milk.
Bottles of 5, 10 and 50 cc.

DRISDOL IN PROPYLENE GLYCOL

MILK DIFFUSIBLE VITAMIN D PREPARATION

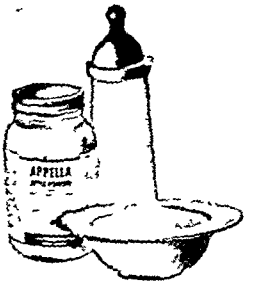
ODORLESS · TASTELESS · ECONOMICAL

DRISDOL, trademark Reg U S Pat Off & Canada, Brand of Crystalline Vitamin D_2 (calciferol) from ergosterol

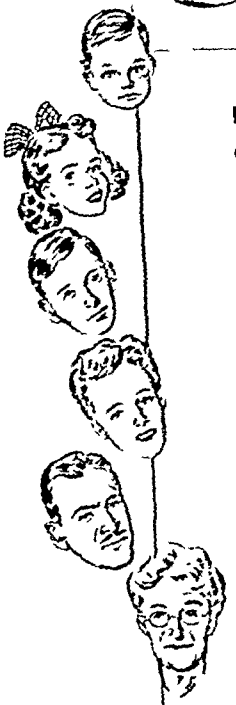
Winthrop

CHEMICAL COMPANY, INC.

New York 13, N. Y. Windsor, Ont.



FROM PEDIATRICS TO GERIATRICS



Diarrhea—a constantly recurring problem...effectively controlled with

Appella

APPLE POWDER

For Infants—Pleasant, easy to mix, Appella passes readily through nipple openings when added to water, milk or infant feeding formulas.

For Older Patients—Mixed to the consistency of applesauce or further diluted with any acceptable fluid, Appella alone or as an adjunct to specific therapy, effectively aids in checking and controlling diarrhea—usually within twelve to twenty-four hours.

COMPOSITION—A blend of several selected varieties of apples in powdered form, Appella retains all the pectin, uronic acids, tannic acid and cellulose of the fresh fruit—offers uniform composition the year 'round.

ADMINISTRATION—For Infants Four level teaspoonfuls of Appella diluted with 8 ounces of fluid . . . usually three times a day.

For older children and adults Four level teaspoonfuls or more in sauce or fluid form every three hours or oftener.

Further facts and a trial supply will be sent upon request.

Supplied in 7-oz. jars for prescription use, 18-oz. jars for hospital use

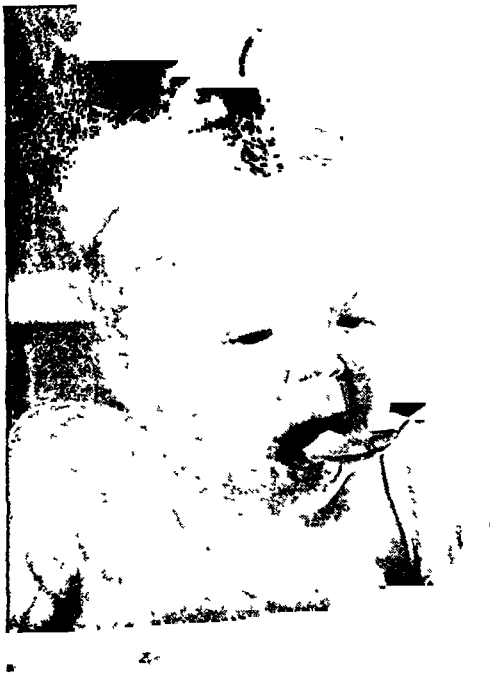
Frederick Stearns & Company
Division
DETROIT 21, MICHIGAN

NEW YORK · KANSAS CITY · SAN FRANCISCO · ATLANTA
WINDSOR, ONTARIO · SYDNEY, AUSTRALIA · AUCKLAND, NEW ZEALAND

*Trade-mark APPELLA Reg. U. S. Pat. Off.

FACTS for doctors and dietitians on special diets in which the use of an enriched, easily prepared cereal of high nutritive value is indicated.

Is there an ideal cereal for infant feeding?



For over 50 years Cream of Wheat has been recommended as an excellent first solid food for babies. It provides important nutrients in a form easily digested by infants and small children. It is also useful in certain nutritional and digestive disorders.

IRON. "Enriched 5 Minute" Cream of Wheat is an excellent source of well-utilized Iron for infants. An average serving (two level tablespoons, dry weight—20 grams) provides 8 5 mg of Iron—110% of the recommended daily minimum requirement for children under 6* and 83% for those over 6.

Clinical tests prove this cereal, fed infants between 3 and 5 months old as the first soft solid food, is a satisfactory source of Iron. It is very valuable in cases of nutritional anemia (often found in infants from 4 to 14 months old). The Iron in "Enriched 5 Minute" Cream of Wheat is as available as medicinal Iron (ferrous sulphate) and essentially as effective.

VITAMINS. "Enriched 5 Minute" Cream of Wheat provides whole wheat amounts of B_1 (Thiamine); also contains Niacin Vitamin. An average serving (two level tablespoons, dry weight—20 grams) supplies 40% of recommended daily minimum requirement of B_1 for infants, 20% for children under 6, 12% for those over 6.

CALCIUM: PHOSPHORUS. An average serving of "Enriched 5 Minute" Cream of Wheat (two level tablespoons, dry weight—20 grams) provides 12% of recommended daily minimum requirement of Calcium; 14% of that of Phosphorus for children.* Extensive tests show the Calcium and Phosphorus are utilize fully as well as the corresponding element contained in milk. Another study has re vealed that the ingestion of the cereal by infant slightly increased the serum calcium leve

EASY DIGESTIBILITY. Clinical tests prov that only 5 minutes' boiling is required t fully break down the starch cells in "En riched 5 Minute" Cream of Wheat. Longe cooking is not necessary, even for use i infant formulas or as a starting cereal.

Complete digestion of "Enriched 5 Min ute" Cream of Wheat was checked by micro scopic examination of stools of small infant (3 weeks to 6 months). No raw starch gran ules were in the stools when this cerea (boiled only 5 minutes over open flame) wa used as the one source of starch. Test in cluded formulas and solid food.

SPECIAL USES. "Enriched 5 Minute" Crean of Wheat's high content of available Iron i useful in preventing nutritional anemia i infancy. In pyloric spasm, thick formula which use this cereal provide nourishmen in a well-retained form. In diarrhea, th cereal's very low crude fiber content (1 par in 200) makes it possible to provide im portant nutrients without rough, irritatin particles.

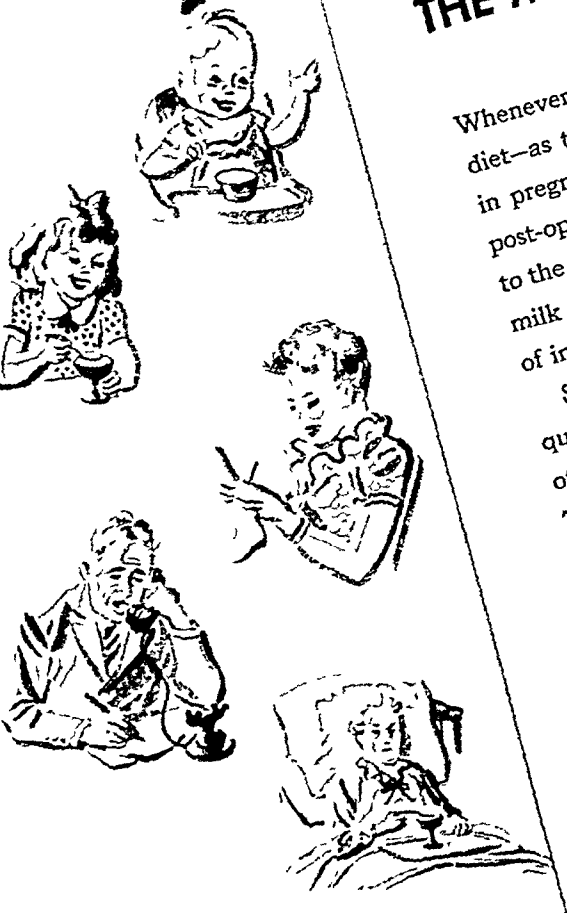
* Minimum daily requirement for infants not established by U S Government One average serving of Enriched 5 Minute Cream of Wheat supplies more than the full daily minimum of Iron and 10% of the daily minimum of Calcium and Phosphorus for infants as recommend-d by the Food and Nutrition Board of the National Research Council

NOTE For free booklet on use of "Enriched 5 Minute" Cream of Wheat in infant feeding, diets for expectant mothers, diets for the aged and bland diets, plus free sample package of the cereal (4-6 servings), write The Cream of Wheat Corporation, 741 Stinson Blvd. Minneapolis 13 Minnesota.

"Cream of Wheat" Trademark Reg. U. S. Pat. Off.

Tempting

THE MILK-JADED PALATE

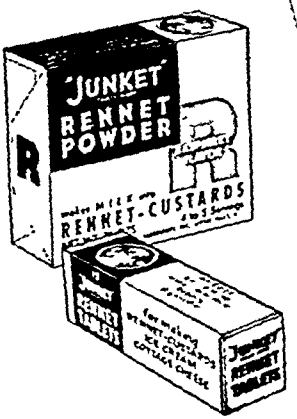


Whenever milk is an important "must" in the diet—as throughout infancy and childhood, in pregnancy, gastrointestinal and post-operative conditions, etc.—appealing to the eye and palate by "dressing up" milk is frequently the only means of insuring an adequate intake.

Such a transformation is easily and quickly accomplished with the aid of "Junket" Rennet Powder or Tablets, which make uncooked milk into deliciously flavored rennet-custards. They are highly tempting, yet more readily digested than ordinary cow's milk by virtue of the softer, more finely flocculent curds produced in the stomach by rennin.

"JUNKET" BRAND FOODS
Division of
Chr. Hansen's Laboratory, Inc.
LITTLE FALLS, N. Y.

77-C



MAKE RENNET CUSTARDS WITH EITHER "Junket" Rennet Powder—six popular flavors, already sweetened; "Junket" Rennet Tablets—not sweetened or flavored—add sugar and flavor to taste.

"JUNKET" is the trade-mark of Chr. Hansen's Laboratory, Inc., for its rennet and other food products and is registered in United States and Canada.

To assist in your pediatric diet problems, four highly authoritative Infants' and Children's diet lists are available—at no cost or obligation. "Personalized" with your name, address and phone number, physicians find them comprehensive, flexible and time-saving. May we send samples?



MANDELAMINE

Reg. U. S. Pat. Off.
(Methenamine Mandelate)

IS AN ESPECIALLY EFFECTIVE URINARY ANTISEPTIC

Safety, ease of administration, and characteristically prompt action combine to make Mandelamine an especially efficient agent in the treatment of urinary infections in children and in elderly patients.

Freedom from drug toxicity is an important consideration to the busy physician who is unable to maintain patients under close medical supervision. Mandelamine may be confidently prescribed in therapeutic dosage virtually without consideration of toxic effects.

Uncomplicated oral administration of Mandelamine requires no supplementary acidification, restriction of fluid intake, dietary control, or other special measures. Only in those infections due to urea-splitting organisms, may accessory acidification be necessary.

Early control of common urinary infections is the characteristic response to Mandelamine therapy. Disturbing urinary symptoms are usually alleviated rapidly and, in the absence of obstruction, the urine is promptly cleared of organisms in a high percentage of cases.

Mandelamine is supplied in enteric coated tablets of 0.25 Gm. (3¾ grains) each, in packages of 120 tablets sanitaped, and in bottles of 500 and 1000.



NEPERA CHEMICAL CO. INC.
21 Gray Oaks Ave.
Yonkers 2, New York
Please send me literature, and a physician's sample of Mandelamine.

Name.....M.D.

Street.....

City.....State.....

NEPERA CHEMICAL CO. INC.

Manufacturing Chemists Yonkers 2, New York

CONDITIONS

Constipation—Loose irritating stools—Periods of alternating constipation and loose stools.

ADVANTAGES

Zymenol's Twofold Natural Therapy: Brewers yeast enzymatic action helps re-establish physiological bowel content. Natural vitamin B complex tends to normalize bowel tone.

Non-Habit-Forming: No irritant or habit-forming drugs. No bulking agents. Even sugar free.

Teaspoon Dosage Only: Minute quantity of mineral oil per dose is not likely to interfere with vitamin absorption or digestion. Avoids leakage.

Available in the United States and Canada—prescription units of drug stores everywhere.



Zymenol

For Effective Bowel Management

An Emulsion with Brewers Yeast

MAIL THIS COUPON

Otis E. Glidden & Co., Inc., 518 Davis Street, Evanston, Ill.
Please send literature and trial supply of ZYMENOL

Dr.....

Address.....

City.....Zone ...State.....

OTIS E. GLIDDEN & CO., INC., EVANSTON, ILL.

In INFANTILE ECZEMAS and DIAPER RASH

When Baby cannot tolerate SOAP



LOWILA

for DIAPER RASH and Infantile Eczema due to or aggravated by soap

COMPLETELY SOAPLESS, NON-IRRITANT EFFICIENT SKIN CLEANSING

LoWILA* Cake

Superbly mild, lathering detergent; no alkali; correct pH; less slippery, therefore, allows firmer hold on baby in bath. NEW 6-oz. cake more convenient, more economical.

ADVERTISED IN AMERICAN MEDICAL ASSOCIATION PUBLICATIONS

LoWILA *Liquid*

Washes diapers beautifully, gently, without the irritating residue left by soaps. Very economical.

Mother's skin, too, will appreciate **LoWILA**

* T.M. Reg. U.S. Pat. Off.

WRITE FOR SAMPLE AND LITERATURE

Westwood PHARMACAL CORP.

468 DEWITT ST., BUFFALO 13, N.Y.

COMPARE THIS INFANT CEREAL WITH ANY OTHER!

For ingredients... Clapp's Instant Cereal is made from the following ingredients: whole wheat meal, corn meal, wheat germ, malt, nonfat dry milk solids, calcium phosphate, dried brewers' yeast, salt, and iron ammonium citrate.

For nutritional values... 1 oz. serving of Clapp's Instant Cereal furnishes the following percentages of the minimum daily requirements:

For infants, vitamin B_1—120%, vitamin B_2—20%.

For young children, vitamin B_1—60%, Iron—113%, Calcium—32%, Phosphorus—22%.

(The essential Calcium, Phosphorus, and Iron requirements of infants, and the vitamin B_2 requirements of children have not been established.)



Typical Analysis of Clapp's Instant Cereal

Carbohydrate 73.1%	Iron (Fe) 30 mg. per 100 gm.
Protein (Nx6.25) 15.0%	Copper (Cu) 2 mg. per 100 gm.
Fat (ether extract) .8%	Thiamine (B_1) 1.0 mg. per 100 gm.
Ash (total minerals) 3.8%	Riboflavin (B_2) 0.3 mg. per 100 gm.
Crude Fiber 1.6%	Moisture 5.7%
Calcium (Ca) 800 mg. per 100 gm.	Calories per ounce 102.
Phosphorus (P) 580 mg. per 100 gm.	

For taste ... When mothers report a "Cereal Problem," suggest a change to Clapp's. Infant cereals vary widely in flavor. The sweet, nutty flavor of Clapp's is one most babies love.

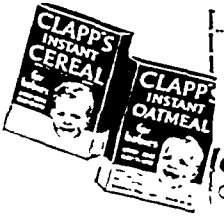
For texture . . . The fine, but definite, texture of Clapp's Baby Cereals is readily accepted by babies. This texture, marking a distinct advance over a liquid diet, prepares the infant for later progress to solid food.

• • •

The Council on Foods of the A.M.A. suggests that infants' cereals may well be selected upon the basis of furnishing vitamin B_1 and Iron. Both Clapp's Instant Cereal and Clapp's Instant Oatmeal are excellent sources of these two food elements.

For generous professional samples—mail this coupon

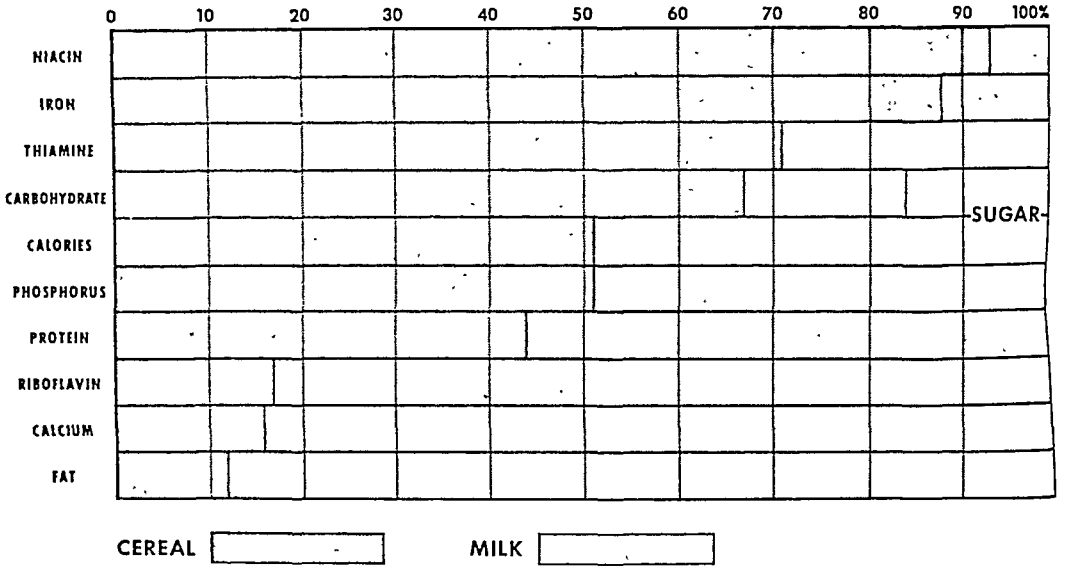
CLAPP'S BABY CEREALS



Clapp LABORATORIES, INC.
OFFICES: 350 FIFTH AVENUE • NEW YORK 1, N. Y.

PRODUCTS OF AMERICAN HOME FOODS

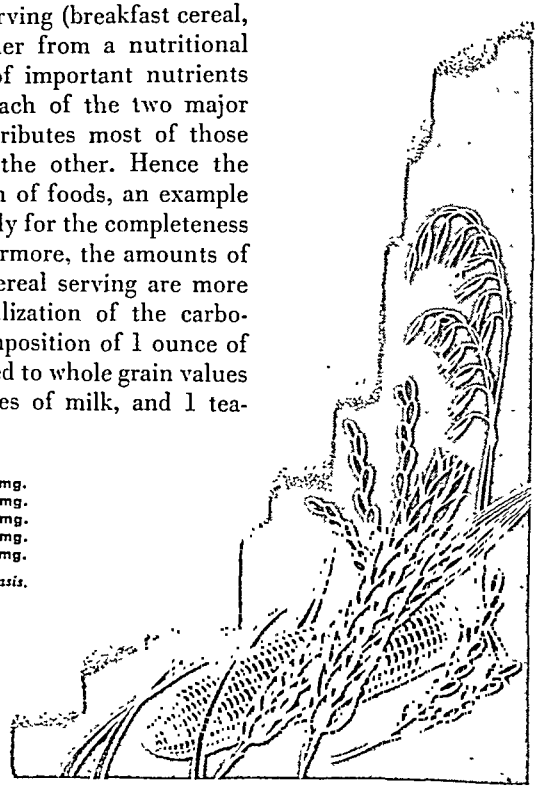
Excellent Nutritional Supplementation



The chart reproduced above illustrates the excellent manner in which the foods comprising the cereal serving (breakfast cereal, milk, and sugar) complement each other from a nutritional standpoint. It depicts the percentage of important nutrients contributed by each food. Note that each of the two major components of the cereal serving contributes most of those nutrients supplied less generously by the other. Hence the cereal serving is a balanced combination of foods, an example of the importance of selecting foods wisely for the completeness of their combined contributions. Furthermore, the amounts of B-complex vitamins contained in the cereal serving are more than adequate to permit metabolic utilization of the carbohydrates provided. The quantitative composition of 1 ounce of cereal* (whole grain, enriched, or restored to whole grain values of thiamine, niacin, and iron), 4 ounces of milk, and 1 teaspoonful of sugar is shown in the table.

CALORIES.....	202	PHOSPHORUS...	206 mg.
PROTEIN.....	7.1 Gm.	IRON.....	1.6 mg.
FAT.....	5.0 Gm.	THIAMINE.....	0.17 mg.
CARBOHYDRATE	33.0 Gm.	RIBOFLAVIN....	0.24 mg.
CALCIUM.....	156 mg.	NIACIN.....	1.4 mg.

Composite average of all breakfast cereals on dry weight basis.



CEREAL INSTITUTE, INC.

135 South La Salle Street • Chicago 3

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

OMPLETE REMISSION

in

Aural Infections

★ DRAWS PLASMA TO SURFACE . . . ★ DISSOLVES NECROTIC TISSUE

BACTERICIDAL, DEODORANT, DETERGENT, PEPTIZING, NON-TOXIC

Glycerite of Hydrogen Peroxide *ipc*

With Carbamide

Clinical studies concerned with the use of Glycerite of Hydrogen Peroxide in the treatment of chronic purulent otitis media demonstrated seventeen of twenty-nine patients in complete remission in 14 days and the remainder by the 38th day. The patients studied presented conditions existent for periods of 2 weeks to over 40 years. Previous treatment by the usual therapeutic means, including tyrothricin or penicillin, was ineffective in all cases.

★ BIBLIOGRAPHY

Arch. Otolaryngol., 43 605, 1946.
E., E., N., & T. Mo., 26 27, 1947.
Laryngoscope, 56 556, 1946.
New Eng. J. Med., 234 468 1946.
Annals of Allergy 4 33 1946.
J. A. Ph. A. (Sc. Ed.) 35 304, 1946.

Literature on request.

Constituents:

Hydrogen Peroxide 1.446%, Urea (Carbamide) 2.554%, 8 Hydroxyquinoline 0.1%. Dissolved and stabilized in substantially anhydrous glycerol . . . q.s. ad. 30cc.

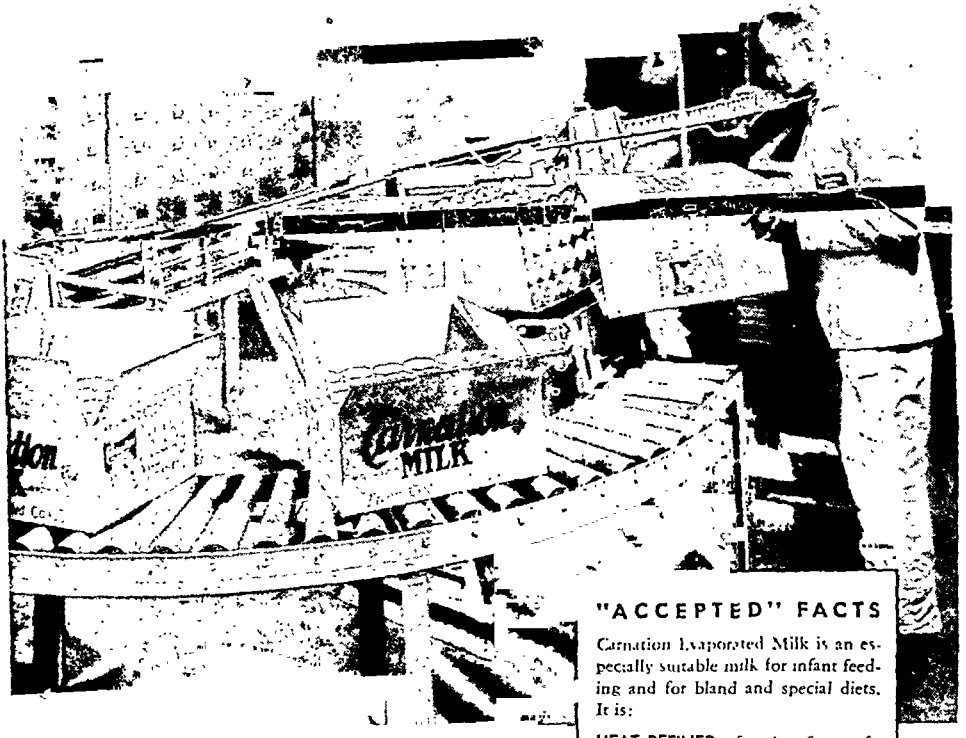
Available on prescription in one-ounce bottle with dropper.

Administration One half dropperful two to four times daily.

International PHARMACEUTICAL CORPORATION

132 NEWBURY STREET, BOSTON 16, MASSACHUSETTS

The milk's a-movin'!



Plenty of it! It's rolling along conveyors, sliding into cartons, and hustling out into food stores everywhere . . . Carnation Evaporated Milk, now fortified with pure *crystalline* vitamin D_3. Physicians preferring this trusted milk for infant-feeding formulas may now specify it with full confidence that mothers can obtain it. . . . Carnation production, generally adequate for the first time in several years to meet the insistent demand, is *quality* production first. *Quantity* production is never increased until strict Carnation standards can be met.

"ACCEPTED" FACTS

Carnation Evaporated Milk is an especially suitable milk for infant feeding and for bland and special diets. It is:

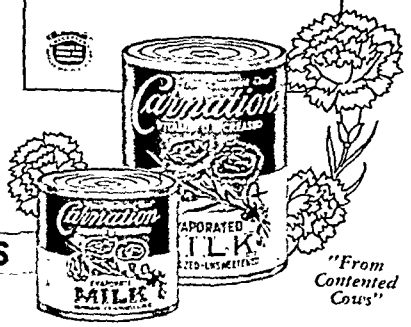
HEAT-REFINED—forming fine, soft, flocculent, low-tension curds.

HOMOGENIZED—with butterfat minutely subdivided for easy assimilation.

FORTIFIED—containing pure crystalline vitamin D_3, 400 U.S.P. units per pint.

STANDARDIZED—for uniformity in fat and total solids content.

STERILIZED—after hermetic sealing, insuring bacteria-free safety and markedly diminished allergenic properties.



the Milk EVERY DOCTOR KNOWS

"From Contented Cows"

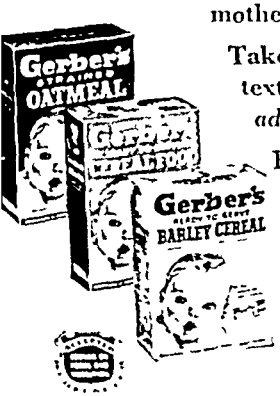


Are babies too much like people?

Babies would be a lot less trouble if they'd automatically like all the things that are good for them. But they won't.

So Gerber's can't stop at making baby foods that are merely "good for" babies. It isn't nearly enough that the high nutritional values of Gerber's Baby Foods please doctors.

We have to be specialists in making foods that babies like better, too. In fact, one of the reasons Gerber's please so many mothers is that babies like them so well.



Take Gerber's 3 Cereals. All 3 have the "just right" taste and texture that babies go for. And all three are enriched with *added iron, calcium,* and *vitamin B-complex.*

From Cereals through Strained and Junior Foods . . . *there isn't a single one of all Gerber's 34 baby foods that isn't specially prepared to suit baby tastes.*

A card to Gerber's, Dept. 277-7, Fremont, Mich., will bring you samples of the cereals, together with professional reference cards.

Gerber's

FREMONT MICH. OAKLAND CAL.

Baby Foods

3 CEREALS • 18 STRAINED FOODS • 13 JUNIOR FOODS

On the Plus Values In Variety Meats

Variety meats—as the meat industry terms liver, kidney, heart, thymus (sweetbreads), and tongue—are at least as nutritionally desirable as muscle meat. In fact, in some respects certain organ meats are superior.

They provide the indispensable amino acids in the same advantageous complete assortment as muscle meat. Hence their protein is of the same high biologic value, capable of meeting every protein need of the organism. Quantitatively their protein content is approximately equal to that of muscle meat.

For hemoglobin synthesis, liver and kidney have been found superior not only to all other protein sources so far studied but also to muscle meat itself.

All organ meats are good sources of the B-complex vitamins. Some of them, such as liver and kidney, are especially rich in niacin. Liver is also an excellent source of vitamin A.

Apparently the vital role these organs play in the functioning of the animal body is reflected in the valuable contribution they can make to human nutrition. Their frequent inclusion in the human dietary—during disease as well as in health—is amply justified.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.



AMERICAN MEAT INSTITUTE

MAIN OFFICE, CHICAGO . . . MEMBERS THROUGHOUT THE UNITED STATES



Ayerst "Beminal" preparations are specifically designed to replace "square-peg-round-hole" vitamin therapy. Kept constantly in line with latest therapeutic developments, they provide a range of five distinctive combinations for selective treatment.

"BEMINAL" Forte with VITAMIN C (Capsules) No. 817. Highly potent preparation of B factors with vitamin C.

"BEMINAL" Forte INJECTABLE Dried No. 495. High concentration of important B factors for intensive therapy.

"BEMINAL" GRANULES No. 925. Vitamin B complex in a dry, palatable and readily soluble form.

"BEMINAL" with IRON and LIVER (Capsules) No. 816. Ferrous carbonate, liver and B complex for the treatment of iron deficiency anemias.

"BEMINAL" TABLETS No. 815. For the prophylaxis and treatment of mild or subclinical vitamin B complex deficiencies.

"BEMINAL"®
FOR "B" THERAPY

AYERST, McKENNA & HARRISON Limited
22 EAST 40TH STREET, NEW YORK 16, N. Y.

Heinz Strained Peas

Give Baby Important Vitamins



Heinz Retains More Uniform Vitamin Content than Is Possible with Usual Home-Kitchen Methods

BABIES also enjoy other Heinz Strained Vegetables — such as Strained Beets, Carrots and Spinach. You can always rely on their fine flavor, color and smooth, inviting texture!

YOU know that the babies in your care need iron and vitamins B_1 and C for good growth and health — and we can assure you that they get these nutritive elements in Heinz Strained Peas! For Heinz uses sweet, tender peas — scientifically cooks them within a few hours of harvesting! Vitamins and minerals are retained in high degree. Recommend high-quality Heinz Strained Peas for your youngest patients!

HEINZ
STRAINED
PEAS
57 VARIETIES
MADE BY
H. J. HEINZ COMPANY
57

A 78-Year Reputation Backs the Complete Line of

Heinz Baby Foods

CEREALS • FRUITS • VEGETABLES
MEAT FOOD PRODUCTS • DESSERTS



BABY'S FIRST PEEK-A-BOO

Such fun! It's hard to tell who's happier—laughing baby or proud mother. And because baby is her special joy. mother naturally selects White House Milk for the formula. White House is ideal for infant feeding because it's creamy-rich, easy to digest, and generously fortified with pure vitamin D_3. There's none better!

WHITE HOUSE MILK

There's None Better

400 U.S P UNITS OF PURE VITAMIN D, PER PINT

SOLD AND GUARANTEED* BY A&P

Mother's first thought for infant feeding!



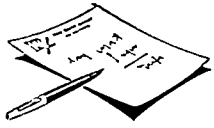
A&P

*Satisfaction Guaranteed or money back

Not Connected With Any Company Using A Similar Name Or Brand



Mrs Clyde Thoma of Oshkosh Wisconsin who was raised herself on KARO and milk, is convinced KARO is "Formula No 1 for her baby Pat*



"Formula No. 1"

FOR nearly 30 years KARO Syrup has been the prescribed milk modifier for millions of babies. Doctors have watched KARO infants grow to maturity . . . have seen them become the mothers and fathers of a second generation of sturdy KARO youngsters.

The dextrin, maltose and dextrose content of KARO Syrup continues to be non-fermentable, bacteriologically safe and non-allergenic. KARO is readily miscible in milk. *Red Label* KARO and *Blue Label* KARO, now generally available, are interchangeable in all formulas.

☆

Medical Division
CORN PRODUCTS SALES COMPANY
17 BATTERY PLACE, NEW YORK 4, N Y



*KARO is a registered trade mark of Corn Products Refining Company, New York N Y

EFFECTIVES . . .
but not cure-alls



Modern therapeutics support the premise that no single medication will successfully combat all ear conditions. For that reason . . . DOHO, specialists in the development of effective ear medications . . . offer

Auralgan

IN ACUTE OTITIS MEDIA

When pain, fever, edema, leucocytosis, sense of fullness and impaired hearing are present—AURALGAN by its potent decongestant, dehydrating and analgesic action provides effective relief of pain and inflammation.

O-TOS-MO-SAN

IN CHRONIC SUPPURATIVE OTITIS MEDIA

O-TOS-MO-SAN provides a new Sulfa combination of Sulfathiazole and Urea in Auralgan Glycerol (DOHO) base, completely water-free and having the highest specific gravity obtainable—scientifically developed.

O-TOS-MO-SAN exerts a powerful solvent action on protein matter . . . liquefies and dissolves exuberant granulation tissue . . . cleanses and deodorizes the site of infection . . . and tends to exhilarate normal tissue healing in the effective control of chronic suppurative Otitis Media. Excellent results have also been obtained in furunculosis of the external ear canal.

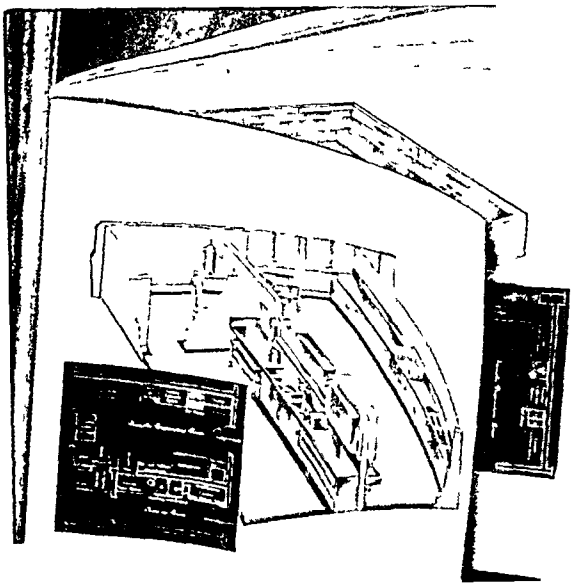
Write for Literature and Samples

NOTE:
Where there is an intact ear drum, neither Sulfonamides nor Urea are effective . . . and under these conditions AURALGAN is indicated.

WARNING!
The indiscriminate use of the Sulfonamides should be avoided—so that infectious organisms do not become "sulfa-fast" or patients "sensitive" to Sulfa.

THE DOHO CHEMICAL CORPORATION

New York 10, N. Y. - Montreal - London



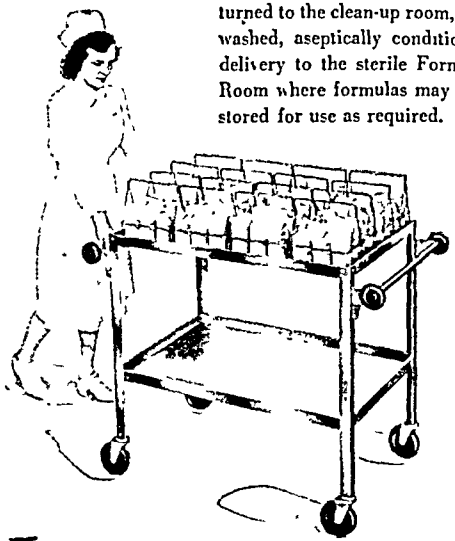
A Challenge is met...

Mass spread of diarrheal diseases of the newborn, potentially traceable to inefficient and outmoded procedures and facilities designed to insure the sterility of foods and supplies, can be effectively reduced . . . often eliminated, with the new "American" developed

Milk Formula Laboratory Service

PRESENTS A COMPLETE PROGRESSIVE ROUTINE

Provides unprecedented efficiency, speed and safety. Used containers and supplies, when returned to the clean-up room, are conveniently washed, aseptically conditioned for prompt delivery to the sterile Formula Preparation Room where formulas may be prepared and stored for use as required.



MEETS ALL CAPACITY NEEDS

Units of equipment which include special bottle washing units, sterilizer-disinfectors, precision water sterilizers, work counters, storage cabinets, bottle warmers, portable carriages and allied units are designed to accommodate capacity requirements of from 72 bottles per day up to unlimited needs.

CONSULT OUR PLANNING SERVICE...

staffed by able technicians thoroughly qualified to assist you in planning an installation best suited to your available facilities... a gratis service.

WRITE TODAY for complete details

AMERICAN STERILIZER COMPANY
Erie, Pennsylvania

DESIGNERS AND MANUFACTURERS OF SURGICAL STERILIZERS, TABLES AND LIGHTS

CEREVIM *is 19% protein*

"... cow's milk ... furnishes about 19 per cent of its calories in the form of protein ..."

—H. C. SHERMAN[1]



CEREVIM has an unusually high protein content for a cereal food, considerably more than is found *in natural grains*. Whole wheat, for example, contains 11 per cent. The protein in CEREVIM, moreover, is largely of animal origin (supplied by milk solids) and hence is of high biologic quality.

This extra margin of protein in CEREVIM takes on significance particularly when the child is no longer on a milk diet or rejects a well-rounded diet.

An ounce of CEREVIM provides not only about 5½ grams of protein but also the recommended daily dietary allowance of iron, *thiamine, riboflavin* and *niacin* for children up to three years of age.[2]

1 H C Sherman Chemistry of Food and Nutrition 1946

2 Recommended Dietary Allowances, National Research Council, 1945

Trade Mark CEREVIM Reg U S Pat Off

LEDERLE LABORATORIES DIVISION
AMERICAN CYANAMID COMPANY • NEW YORK 20, NEW YORK

Lederle

[redacted] IS USING UP MORE ENERGY?



Foolish question! "Casey at the bat," of course. Moral: recommend Instant Ralston as part of youngsters' good breakfasts during warm weather.

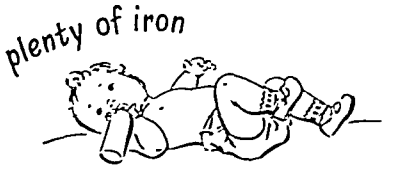
Why? Children's summer activities, in contrast with quieter school-day studies, make greater demands on their supply of energy. Whole grain nourishment, supplied by Instant Ralston, provides fuel for these energy-consuming activities. Instant Ralston provides thiamine, too, the vitamin which helps boost lazier summer appetites. (Wheat germ is the richest cereal source of thiamine, and Instant Ralston has 2½ times as much wheat germ as natural whole wheat itself!)



Only *ten seconds* to cook, too! Gives children the advantages of hot cereal as an aid to digestion and sense of well-being. A boon to mothers who dislike long periods spent in cooking during hot weather.

◁ TWO KINDS OF HOT RALSTON

RALSTON PURINA COMPANY
Checkerboard Square, St. Louis 2, Mo.





HUNGRY, HEALTHY, HAPPY Infa-Concemin Kids









Too young to be impressed by the fact that it's good for them, infants and children take Infa-Concemin because it tastes good. They like it! Infa-Concemin is the *one* B complex-iron concentrate designed specifically for small patients. It combines: (1) pleasant taste, (2) the *whole* B complex. (3) an adequate hematinic, and (4) concentrated drop dosage.

....INFA-CONCEMIN..... A MERRELL PEDIATRIC SPECIALTY...

Vitamin B Complex with Ferrous Sulfate

Each 1 cc. contains:

Thiamine hydrochloride	0.8 mg.
Riboflavin	0.8 mg.
Niacinamide	5.0 mg.
Pyridoxine hydrochloride	0.5 mg
Liver, B complex fraction	67.5 mg.
Rice bran extract	67.5 mg.
Ferrous sulfate	37.5 mg.

Indications

Deficiency states associated with anorexia—malnutrition—restricted growth—irritability; as a tonic in post-sulfonamide debilitation and recuperative phases of severe respiratory infections.

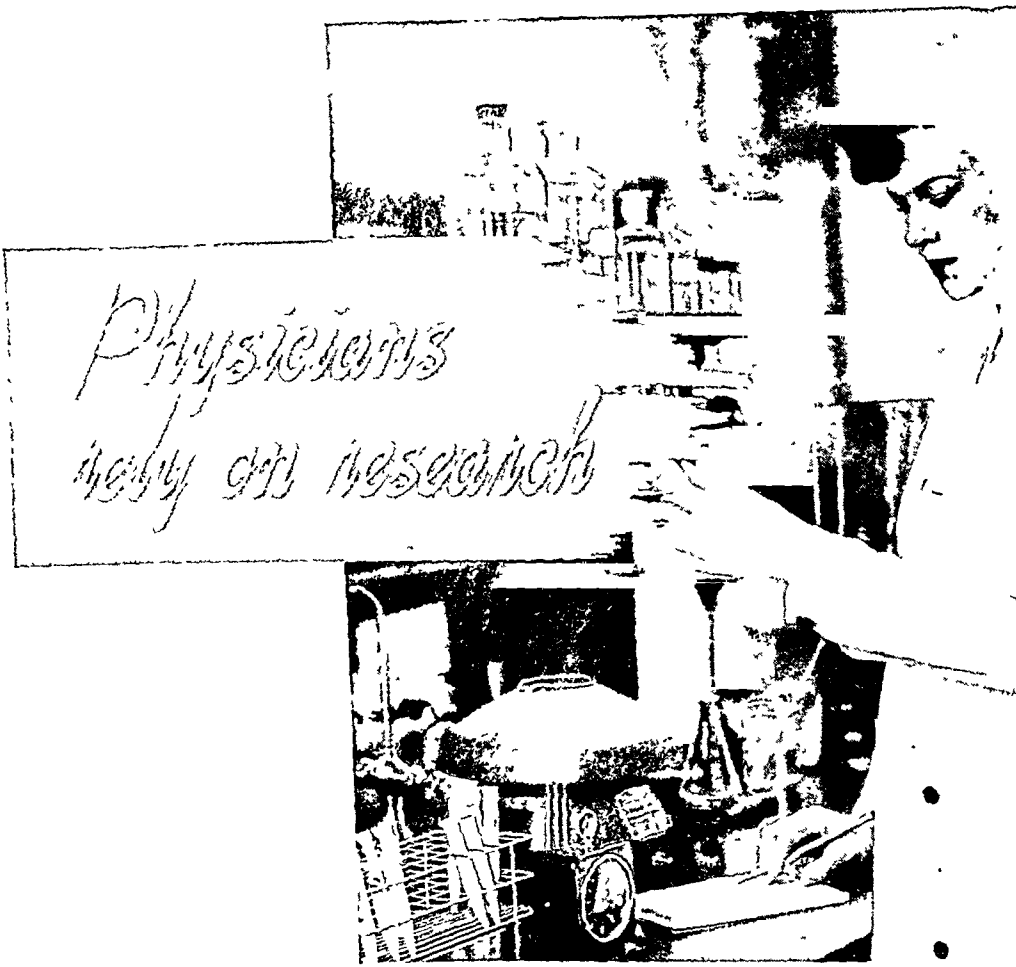
Average dose 1 to 3 cc daily (20 to 60 drops from dropper enclosed in package) in milk, fruit juice or directly into the mouth. Available in 30 cc dropper bottles and 8 oz bottles.



Trademark Infa-Concemin Reg U S Pat Off

MERRELL 1828

THE WM. S. MERRELL COMPANY · CINCINNATI, U.S.A.



Actual Photograph of Marcelle Laborat

MEDICAL TRAINING and experience through the years have convinced physicians of the value of research. That's why Marcelle hypo-allergenic Cosmetics enjoy such widespread confidence with physicians. These quality cosmetics are built on research . . . known allergens have been eliminated or reduced to tenable minimums. You can prescribe them with assurance wherever cosmetics are a causative or contributing factor in allergies. We extend a cordial invitation to inspect our laboratory . . . watch the skilled precision in the blending and testing of these quality cosmetics.

Acceptable for advertising in publications of the American Medical Association for 15 years.

MARCELLE COSMETICS

MARCELLE COSMETICS, INC.
1741 N. WESTERN AVE., CHICAGO 47, ILL.



good taste in vitamins

Each serving (2 heaping teaspoonfuls) contains approximately:

Vitamin A	2000 U.S.P. units
Vitamin B_1 (Thiamine hydrochloride)	2 mg
Vitamin B_2 (Riboflavin)	1 mg
Vitamin C (Ascorbic acid)	75 mg
Vitamin D (Activated ergosterol)	500 U.S.P. units
Niacinamide	5 mg

Cal-C-Tose is never advertised to the laity.

Cal-C-Tose,* mixed with hot or cold milk, makes a refreshing, nutritious beverage which tempts even jaded appetites. This tasty chocolate drink supplies liberal amounts of vitamins A, B_1, B_2, C, D, and niacinamide, as well as calcium, phosphorus, iron, and other nutrients. Patients actually enjoy vitamins in the form of Cal-C-Tose.

Hoffmann-La Roche, Inc. • Nutley 10, N. J.

CAL-C-TOSE 'ROCHE'

*Reg U.S. Pat. Off.

BRISTOL Penicillin in Oil and Wax is now

LIQUID

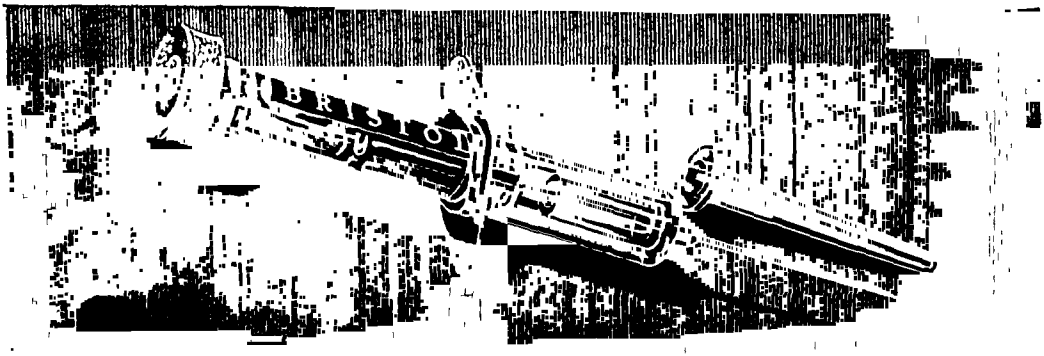
. . . for easier administration

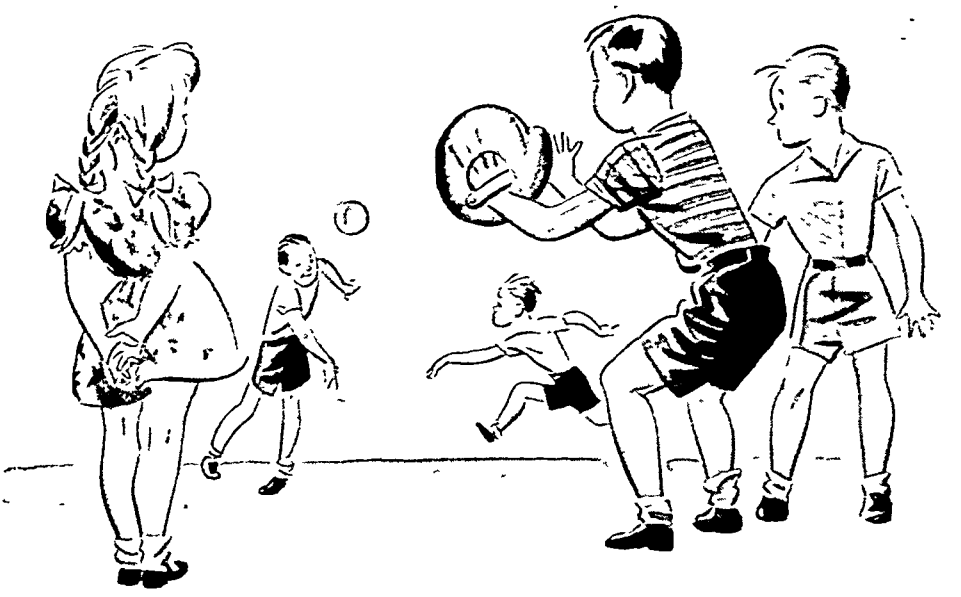
Now you can inject Bristol's Crystalline Sodium Penicillin G in Oil and Wax (Romansky Formula) with far greater ease than in the past. Due entirely to changes in the manufacturing process and without any alteration in formula, the viscosity of the product at room temperature has been brought to a point which approximates that of U.S.P. glycerin. Clinical studies meanwhile indicate no change in the ability of the product to maintain adequate levels of penicillin in the blood for about 24 hours.

This is a significant development in penicillin therapy. Specify Bristol and obtain the benefits of LIQUID Romansky Formula.

Supplied in one cc. cartridges of 300,000 units, with or without special syringe equipment, and in 10 cc. rubber-stoppered vials. Needs no refrigeration in storage or warming before use.

Bristol LABORATORIES INC., SYRACUSE, NEW YORK





THE DUAL DEMAND OF GROWTH AND SUMMER ACTIVITIES

The almost incessant daily activity of children is further intensified during the summer months when outdoor games beckon. The high caloric energy expenditure which thus results, coupled with the high metabolic requirements of growth, calls for an unusually large intake of essential nutrients to satisfy this dual demand.

For the satisfaction of these greater needs, the dietary supplement made by mixing Ovaltine with milk offers many advantages. It supplies not only readily assimilated caloric food energy, but also adequate amounts of the B-complex vitamins needed for metabolization. This delicious food drink also provides ascorbic acid and fat soluble vitamins, biologically complete protein, and important minerals. Children enjoy it, hot or cold, and drink it with relish either as a mealtime beverage or with between meal snacks. Two or three glassfuls of Ovaltine in milk daily go far in satisfying the dual demands of growth and summer activities.

THE WANDER COMPANY, 360 N. MICHIGAN AVE., CHICAGO 1, ILL.



Ovaltine

Three servings daily of Ovaltine, each made of ½ oz. of Ovaltine and 8 oz. of whole milk,* provide:

CALORIES	669	VITAMIN A	3000 I.U.
PROTEIN	32.1 Gm	VITAMIN B_1	1.16 mg.
FAT	31.5 Gm	RIBOFLAVIN	2.00 mg.
CARBOHYDRATE	64.8 Gm	NIACIN	6.8 mg.
CALCIUM	1.12 Gm	VITAMIN C	30.0 mg
PHOSPHORUS	0.93 Gm	VITAMIN D	417 I.U.
IRON	12.0 mg.	COPPER	0.50 mg

*Based on average reported values for milk.

new



penicillin troches-C.S.C.

For Prolonged Intra-Oral Penicillin Therapy



HIGH POTENCY. Each Penicillin Troche-C.S.C. contains 5,000 units of Crystalline Penicillin G Potassium. In consequence relatively high penicillin saliva levels are attained for maximal therapeutic efficacy in fusospirochetal (Vincent's) infection of the gingivae, mouth and pharynx, and certain other oral infections responsive to penicillin.

SLOW DISINTEGRATION. Penicillin Troches-C.S.C. dissolve slowly within the mouth, a process which requires from one to two hours. Thus prolonged action is possible from a single troche.

ADHERES TO PALATE. Lenticular in shape, Penicillin Troches-C.S.C. readily fit into the curve of the hard palate, adhering to the mucosa on gentle pressure from the tongue. A penicillin depot is thereby established from which the antibiotic diffuses into the saliva.

CRYSTALLINE POTASSIUM PENICILLIN G. Penicillin Troches-C.S.C. contain Crystalline Penicillin G Potassium Salt. This form of penicillin is highly purified, having a potency of not less than 1435 units per mg.

C.S.C. Pharmaceuticals

A DIVISION OF

COMMERCIAL SOLVENTS CORPORATION

17 E 42nd Street CSC New York 17, N. Y.

Your Job—And Ours:



To Promote Optimal Growth

When the body-building substances of whole cow's milk are fully utilized by an infant, it helps promote optimal growth. And in Nestlé's Evaporated Milk, low curd tension, small curd size, dispersion of milk solids and added Vitamin D, all help promote that necessary digestion and utilization.

NESTLÉ'S
EVAPORATED
MILK

NESTLE'S MILK PRODUCTS, INC.
New York, U. S. A.



Nestlé's Has the "Know-How" to Produce a Good Product

- For 75 years, Nestlé's milk products have been best known, most used for babies 'round the world.
- Nestlé's was the *first* evaporated milk fortified with 400 USP units of genuine Vitamin D_3 per pint.
- Nestlé's accepts milk only from carefully inspected herds. As further assurance of quality, rigid controls check Nestlé's Milk every step of the way. We even take the plant apart every day and wash it!

No wonder so many doctors recommend NESTLÉ'S Milk by name



who says my baby can't taste?

INFANTS exhibit food likes and dislikes early in life, and they quickly learn to associate the appearance of a food with its taste. For this reason, every effort is made to retain the original tastes of the foods from which Libby's are made; uniformity of attractive taste characterizes Libby's Baby Foods. As a result of Libby's exclusive process of homogenization, cellulose cell capsules are ruptured, enhancing the availability of nutrients and making for satin-smoothness of texture. Libby's Baby Foods have been fed as early as the sixth week of life, providing the infant with many essential nutrients which would otherwise be denied him.

Beets • Carrots • Green Beans • Peas • Spinach • Squash • Vegetable Soup • Mixed Vegetables • Garden Vegetables • Liver Soup • Vegetables with Bacon • Vegetables with Beef and Barley • Vegetables with Lamb • Apples and Apricots • Apples and Prunes • Apple Sauce • Peaches • Peaches-Pears-Apricots • Pears and Pineapple • Prunes (with Pineapple Juice and Lemon Juice) • Custard Pudding

Libby, McNeill & Libby • Chicago 9, Illinois



"Man that is born of a woman is of few days, and full of trouble." Job XIV, 1



Even in the face of great advances in medical knowledge, the lives of many infants are still literally "of few days and full of trouble," for 62.1% of the total infant mortality occurs within 30 days after birth.* During this fatal first month, every precaution must be taken to ward off troubles of early infancy.

Adequate nutrition, resistance to disease and freedom from hazardous diarrhea, colic or digestive upset all may be materially advanced by giving special attention to the first feedings.

'Dexin' has proved an excellent "first carbohydrate" because of its high dextrin content. It (1) resists fermentation by the usual intestinal organisms; (2) tends to hold gas formation, distention and diarrhea to a minimum; and (3) promotes the formation of soft, flocculent, easily digested curds.

Simply prepared in hot or cold milk, 'Dexin' brand High Dextrin Carbohydrate provides well-taken and well-retained nourishment. 'Dexin' does make a difference

*Vital Statistics—Special Reports Vol. 25, No 12, National Office of Vital Statistics, Washington, D C (Oct. 15) 1946, p 204.

HIGH DEXTRIN CARBOHYDRATE **'Dexin'** BRAND

Composition—Dextrins 75% • Maltose 21% • Mineral Ash 0.25% • Moisture 0.75% • Available carbohydrate 93% • 115 calories per ounce • 6 level packed tablespoonfuls equal 1 ounce • Containers of twelve ounces and three pounds • Accepted by the Council on Foods and Nutrition, American Medical Association. 'Dexin' Reg. Trademark

Literature on request

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 East 41st St., New York 17, N. Y.

July, 1947



who says my baby can't taste?

INFANTS exhibit food likes and dislikes early in life, and they quickly learn to associate the appearance of a food with its taste. For this reason, every effort is made to retain the original tastes of the foods from which Libby's are made; uniformity of attractive taste characterizes Libby's Baby Foods. As a result of Libby's exclusive process of homogenization, cellulose cell capsules are ruptured, enhancing the availability of nutrients and making for satin-smoothness of texture. Libby's Baby Foods have been fed as early as the sixth week of life, providing the infant with many essential nutrients which would otherwise be denied him.

ACCEPTED COUNCIL ON FOODS AND NUTRITION

Beets • Carrots • Green Beans • Peas • Spinach • Squash • Vegetable Soup • Mixed Vegetables • Garden Vegetables • Liver Soup • Vegetables with Bacon • Vegetables with Beef and Barley • Vegetables with Lamb • Apples and Apricots • Apples and Prunes • Apple Sauce • Peaches • Peaches-Pears-Apricots • Pears and Pineapple • Prunes (with Pineapple Juice and Lemon Juice) • Custard Pudding

Libby, McNeill & Libby • Chicago 9, Illinois



"Man that is born of a woman is of few days, and full of trouble." Job XIV, 1



Even in the face of great advances in medical knowledge, the lives of many infants are still literally "of few days and full of trouble," for 62.1% of the total infant mortality occurs within 30 days after birth.* During this fatal first month, every precaution must be taken to ward off troubles of early infancy.

Adequate nutrition, resistance to disease and freedom from hazardous diarrhea, colic or digestive upset all may be materially advanced by giving special attention to the first feedings.

'Dexin' has proved an excellent "first carbohydrate" because of its high dextrin content. It (1) resists fermentation by the usual intestinal organisms; (2) tends to hold gas formation, distention and diarrhea to a minimum; and (3) promotes the formation of soft, flocculent, easily digested curds.

Simply prepared in hot or cold milk, 'Dexin' brand High Dextrin Carbohydrate provides well-taken and well-retained nourishment. 'Dexin' does make a difference

*Vital Statistics—Special Reports. Vol. 25, No. 12, National Office of Vital Statistics, Washington, D. C. (Oct. 15) 1946, p. 206.

HIGH DEXTRIN CARBOHYDRATE **'Dexin'** BRAND

Composition—Dextrins 75% • Maltose 24% • Mineral Ash 0.25% • Moisture 0.75% • Available carbohydrate 99% • 115 calories per ounce • 6 level packed tablespoonfuls equal 1 ounce • Containers of twelve ounces and three pounds • Accepted by the Council on Foods and Nutrition, American Medical Association. 'Dexin' Reg. Trademark

Literature on request

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 East 41st St., New York 17, N. Y.

. . . when your advice is

"NO SOAP"

. . . and when you prefer a lathering cake detergent for routine use, prescribe DERMOLATE, the new non-irritating, nonabrasive, hypoallergenic skin cleanser. May be used on all skins . . . even on infants . . . for DERMOLATE is actually milder than the mildest castile.

When a non-lathering liquid skin detergent is desired, such as for oily skin and scalp, and for removing residual ointments, ACIDOLATE, the companion product, will be a detergent of choice.

DERMOLATE
Lathering Cake
4 oz. cakes: boxes of 3

ACIDOLATE
Non-Lathering Liquid
8 oz. and gallon bottles

1113 "Acidolate" and "Dermolate" Reg U S Pat Off

RARE CHEMICALS, INC.
HARRISON • NEW JERSEY
West Coast Distributors GALEN CO Richmond, Calif

Not advertised to the laity.





Formulac—

a modern

infant food

FORMULAC Infant Food is a concentrated milk in liquid form, fortified with all vitamins known to be necessary to adequate infant nutrition. No supplementary vitamin administration is required.

By incorporating the vitamins into the milk itself, the risk of human error or oversight is reduced. FORMULAC contains sufficient B complex, Vitamin C in stabilized form, Vitamin D (800 U.S.P. units), copper, manganese and easily assimilated ferric lactate—rendering it a flexible formula basis both for normal and difficult feeding cases. The only carbohydrate in FORMULAC is the natural lactose found in cow's milk. *No carbohydrate has been added.*

FORMULAC, a product of National Dairy research, has been tested clinically, and proved satisfactory. It is promoted to the medical profession alone. FORMULAC is on sale at grocery and drug stores nationally.

• For further information about FORMULAC, and for professional samples, mail a card to National Dairy Products Company, Inc., 230 Park Avenue, New York 17, N. Y.



Distributed by KRAFT FOODS COMPANY

NATIONAL DAIRY PRODUCTS COMPANY, INC.

NEW YORK, N.Y.

Highly effective

in such common

skin disorders as . . . . .

seborrheic dermatitis . . especially in the general care and hygiene of the seborrheic scalp

fungous infections . . . including tinea cruris, tinea pedis, tinea versicolor and tinea corporis

squamous eruptions . . . particularly those involving a seborrheic factor

psoriasis and pityriasis rosea

Pragmatar

the outstanding tar-sulfur-salicylic acid ointment

Smith, Kline & French Laboratories, Philadelphia

INFANTS NEED THREE TO FOUR TIMES MORE PROTEIN PROPORTIONATELY THAN ADULTS.*

MEAT APPROPRIATELY PREPARED MAY BE FED AT ANY AGE.*



Variety...vital to good nutrition

6 body-building meats to help infants form sound eating habits

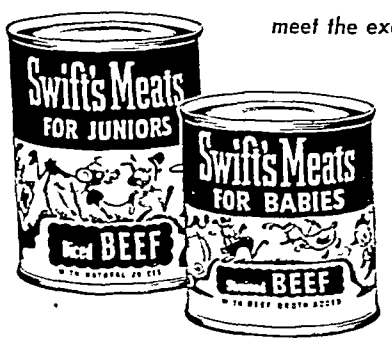
Today's infant eats a wide variety of natural foods *early* in life... for better nourishment and to acquaint him with new flavors and textures at the time when his food habits for life are being formed. The more foods the young infant acquires a taste for, the more nutritionally sound his eating habits will be, for variety is the foundation of good nutrition.

Now, protein-rich meat, with its distinctive taste and texture, takes its place beside the other specially prepared foods for baby. To afford greater variety, finer nutrition in baby's diet, Swift & Company prepared 6 tempting meats: beef, lamb, pork, veal, liver and heart. For very young babies there are Swift's Strained Meats (in clinical studies Strained Meats were fed to infants 6 weeks old.)** For older babies, Swift's Diced Meats are chopped to bite-size cubes. Like babies' other prepared foods, these meats are ready to heat and serve!

Infants, to support their rapid growth, require three to four times more proteins, proportionately, than adults. Meat, one of the finest sources of complete, high-quality proteins, helps meet this demand. In addition, meat provides significant amount of thiamine, niacin and riboflavin plus minerals, especially iron.

Swift's Strained Meats and Swift's Diced Meats . . :

meet the exacting requirements of a highly desirable infant food



1. *Nutrition for growth*—Swift's Meats for Babies furnish complete, high-quality proteins, B vitamins and iron.
2. *Compact form*—for infants' limited capacity—*all meat*, not mixtures, they provide a concentrated source of vital nutrients.
3. *Control—for individual needs.* Ready-made mixtures may fail to meet individual needs. Mothers can control and balance amounts of meat *exactly* with Swift's Strained and Swift's Diced Meats.
4. *Variety for nutritionally sound eating habits*—six different all-meat products to help infants acquire the taste for variety, the foundation of good nutrition.

For complete information and samples of Swift's Meats for Babies and Juniors, write Swift & Company, Dept. R. L., Chicago 9, Ill.



*Name of authorities on request

**Details on request

All nutritional statements made in this advertisement are accepted by the Council on Foods and Nutrition of the American Medical Association.

ACCEPTED

SWIFT & COMPANY CHICAGO 9, ILLINOIS



. . . in B-Vitamin Therapy

Deficiencies of B vitamins are more often multiple than single. For rapid nutritional rehabilitation, therapy should therefore be based on replacement with the complete natural B-Complex, strengthened with massive doses of the individual factors proven nutritionally indispensable in man.[1,2]

• Such authoritative opinions are cogent reasons for prescribing Allbee Robins capsules. They incorporate dried primary yeast—the richest source of B-Complex vitamins—fortified with potent amounts of four crystalline fractions—a formula that has proven brilliantly effective in practice.

FORMULA· *Each capsule contains*

Thiamine	15 mg
Riboflavin	10 mg
Niacinamide	50 mg
Calcium Pantothenate	10 mg
Dried Primary Yeast	292 mg

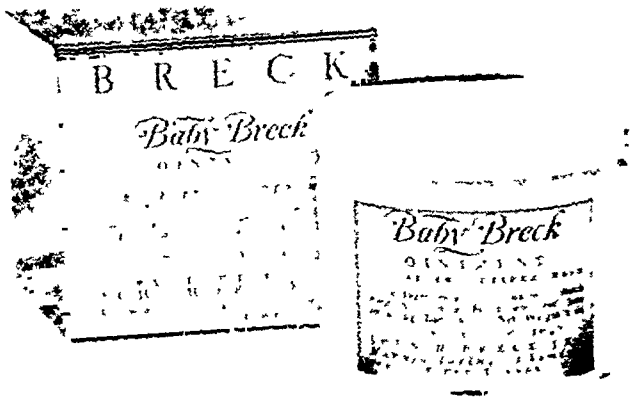
plus these and other factors as found in dried primary yeast

1 Jolliffe, N; J A M.A 129 613, 1945
2 Spies, T J.A M.A 125 245, 1944

A. H. ROBINS COMPANY, INC.
RICHMOND 19, VIRGINIA
Ethical Pharmaceuticals of Merit since 1878

ALLBEE *a Robins Triumph*

THE COMPLETE B-COMPLEX PREPARATION



Baby Breck

OINTMENT

For Aiding Diaper Rash

Baby Breck Ointment was designed for the purpose of eliminating and preventing diaper rash. In moderately severe cases it may be applied at every diaper change. In mild cases of diaper rash Baby Breck Ointment is applied each evening. This Breck Preparation may be recommended with confidence. Baby Breck Ointment is available at drug stores in 2 oz. jars. Sample upon request.

JOHN H BRECK INC · MANUFACTURING CHEMISTS · SPRINGFIELD 3 · MASSACHUSETTS
CANADIAN ADDRESS · 310 SLATER STREET · OTTAWA



EASE AND ECONOMY OF USE

Specification of CARTOSE* as the mixed carbohydrate for infant feeding formulas provides ease and economy of use. The liquid form of this milk modifier permits rapid, accurate measurement, thereby avoiding waste.

Double protection against contamination is afforded by: (1) the narrow neck of the bottle, preventing spoon insertion, and (2) the press-on cap, assuring effective resealing.

CARTOSE supplies nonfermentable dextrins in association with maltose and dextrose . . . a combination providing spaced absorption that minimizes gastrointestinal distress due to fermentation.

Available in clear glass bottles containing 1 pt. • Two tablespoonfuls (1 fl. oz.) provide 120 calories.

CARTOSE

Mixed Carbohydrates

*The word CARTOSE is a registered trademark of H. W. Kinney & Sons, Inc

H. W. KINNEY & SONS, INC. (Kinney trademark) COLUMBUS, INDIANA

The Journal of Pediatrics

VOL. 31 JULY, 1947 No. 1

Original Communications

ROCKY MOUNTAIN SPOTTED FEVER

A PRELIMINARY REPORT ON THE USE OF PARA-AMINOBENZOIC ACID

CLIFFORD J. TICHENOR, M.D., LIEUTENANT SIDNEY ROSS (J.G.), MEDICAL CORPS, UNITED STATES NAVAL RESERVE, AND PRESTON A. MCLENDON, M.D.
WASHINGTON, D. C.

THE present report deals with the general considerations of thirty-six cases of Rocky Mountain spotted fever observed at The Children's Hospital, Washington, D. C., between 1931 and 1946, and the specific management of eight patients treated in the summer of 1946 with para-aminobenzoic acid.

INTRODUCTION

The identification of the disease in the East by Badger, Dyer, and Rumreich[1] in 1931, was followed by the rapid recognition of its prevalence in the central and eastern states. Since 1940, reports of Rocky Mountain spotted fever have come from almost all over the United States, the total annual incidence of reported cases ranging from 400 to 500. In the East the highest incidence is in Maryland, Virginia, and North Carolina. In the Rocky Mountain and Pacific coast states the wood tick, *Dermacentor andersoni*, is responsible for transmission to man. In the East and South the dog tick, *Dermacentor variabilis* is the important carrier.

The total number of cases in the United States reported for the five years, 1933 to 1937 inclusive, was 2,990, with 420 deaths[2]; of these, 1,435 patients and 273 deaths were from the Mountain and Pacific states, with a death rate of 19.4 per cent. In 1944, there were 470 patients with 130 deaths. The mortality varies greatly but remains fairly constant in different localities. In the Bitter Root Valley, it was over 80 per cent for adults and 27.5 per cent for children. The case fatality rate for the entire United States is about 22 per cent and is influenced by the age of the individual rather than by geographic location. In all regions the disease is much more fatal in adults than in children.

In the sixteen-year series at Children's Hospital there was a mortality rate of 8.3 per cent with three deaths in thirty-six patients. The age incidence of the thirty-six patients ranged from 15 months to 13 years, the average being 5 years. Of these, 61.2 per cent were males and 38.8 per cent females. The

From The Children's Hospital, Washington.

high incidence among males is explained by the playing habits of boys, presenting a greater liability to exposure. In this series, 91.7 per cent were white and 8.3 per cent were colored. Nine, or 25 per cent (including the three deaths), developed complications of which there were five cases of pneumonia, two of otitis media, and two of parotitis.

The seasonal incidence of spotted fever corresponds to the tick seasons of the locality concerned. Of the thirty-six cases, all living in the greater Washington area, there was one case in March, one in April, ten in May, ten in June, eleven in July, and three in August. *D. variabilis* in the East appears in March and is most abundant from May to July, but it is reported that they are found as late as November and December. The history of tick bite was elicited in 69 per cent of these patients and was not considered mandatory for a provisional diagnosis.

SIGNS AND SYMPTOMS

The majority of patients were ill for about a week prior to hospitalization. During the prodromal stage, malaise, chilly sensations, and anorexia were common complaints. The invasive stage was accompanied by variable degrees of prostration, headache, irritability, muscular aches, abdominal pain, vomiting, epistaxis, photophobia, lethargy, meningismus, and rarely by delirium and/or coma. In one instance there was edema of the face, feet, and genitals. The spleen was palpable in 25 per cent of the patients.

In the usual instance the temperature rose rapidly to 102° to 104° F. in the first two to three days and remained elevated during the next ten to fourteen days; thereafter, the fever came down by lysis during the third week so that a normal temperature was reached on an average of eighteen days after the onset of the disease.

The rash usually appeared about the third or fourth day after the onset of fever although on occasion its appearance was delayed until the sixth or seventh day. The eruption appeared first on the extremities and back and rapidly became generalized in centripetal fashion. At first it was in the form of rose-colored, elevated macules, palpable and disappearing on pressure. These macules soon became deep red or purplish in color and increased in size, often becoming confluent; within a few days the rash usually became petechial in character. Cutaneous and subcutaneous hemorrhages of considerable size occurred in 40 per cent (severe cases). In the less severe cases the petechiae remained small and discrete to give a mottling "turkey egg" effect. The rash tended to disappear with the subsidence of the fever.

The laboratory findings were not impressive and offered little help initially. The urine was that of any febrile disease. In the uncomplicated cases there was a slight leucocytosis ranging between 8,000 and 12,000 with a moderate shift to the left of the polymorphonuclear elements. In two patients the white blood counts were 25,000 and 30,000 on admission. No initial leucopenias were found. The red cells decreased in number as the disease progressed and transfusions of whole blood or plasma were required in 17 per cent of the patients.

The Weil-Felix reaction was of considerable value in establishing a diagnosis, but the time relationship for positivity only served to emphasize that the diagnosis was essentially clinical during the most critical stage of the disease. The earliest positive agglutination in this series was six days after the onset of fever; in thirty-four out of thirty-six patients, however, the OX19 agglutination titer was below 1:160 before the twelfth day. In all patients but one the titer was diagnostic (i.e., above 1/160) between the third and fourth week. Titers of 1:5,120 were not unusual. One patient was hospitalized on the second day of fever and discharged on the twelfth hospital day, the Weil-Felix reaction being negative at this time. The patient returned to the outpatient clinic as requested twenty-two days after the onset of fever, at which time the agglutination titer was found positive in the dilution 1:640. It is well to point out that the Weil-Felix may be delayed until early convalescence.

The complement-fixation test with antigen from the yolk sac of the chick embryo was performed in six cases and was positive in all at the beginning of the third week. The Children's Hospital was fortunate in having readily available the facilities of the National Institute of Health for such a specific test.

Spinal punctures were performed on twelve, or 33 per cent, of these patients, because of variable central nervous system signs and symptoms. Of these, five showed a pleocytosis ranging between 19 and 75 cells. Spinal fluid chemistries were normal.

Rocky Mountain spotted fever was considered as one of the diagnostic possibilities in thirty-five of the thirty-six patients on admission to the hospital. This is in keeping with the premise that in an area such as ours where there is an unusual geographic concentration of the disease and where the physician is on the alert for its appearance during the tick season, the diagnosis is usually readily made clinically after the appearance of the rash. Other diagnoses which were entertained included typhoid and typhus fever, measles, and meningococcus meningitis. Blood cultures, Widal reactions, and spinal punctures aided in the differential diagnosis. The outstanding clinical difference was found to be the evolution and distribution of the rash.

MANAGEMENT

Prior to the use of para-aminobenzoic acid, the treatment was largely symptomatic and supportive. Eight patients, prior to 1946, received hyperimmune rabbit serum developed by Topping; none of the eight received serum during the first three days of the disease and none had any perceptible diminution in the severity of their course. Serum sickness occurred in two of these patients. "Immune" blood was tried in one severe case but the patient died. Because of the endarteritis in this disease, intravenous fluids have been thought to be contraindicated[3] until recently when Harrell and associates[4] demonstrated that no ill effects were noted when it became necessary to treat peripheral shock or hypoproteinemia by the intravenous route. Our results are essentially in agreement with their conclusions: no untoward reactions were observed following the administration of blood, plasma, amigen, or crystalloid fluids by the intravenous route in the nine patients in whom it was employed.

Use of Para-Aminobenzoic Acid.—In view of preliminary evidence that para-aminobenzoic acid might be a valuable therapeutic agent in the treatment of rickettsial diseases, it was deemed of considerable interest to attempt to treat Rocky Mountain spotted fever at Children's Hospital in 1946 with this drug.

The deleterious effects observed following the use of sulfonamide drugs in rickettsial infections led Snyder and associates[3] to the conclusion that the antagonism between sulfonamide drugs and para-aminobenzoic acid in bacterial growth might be present in a reverse direction in rickettsial infections, and prompted the investigation of the possible virtues of para-aminobenzoic acid against rickettsiae. These authors found that the mortality from experimentally induced murine typhus in mice was considerably reduced when para-aminobenzoic acid was administered In their series, 80 per cent of untreated control mice died while 80 per cent of the mice who received para-aminobenzoic acid survived. Similarly, the inhibitory effects of para-aminobenzoic acid in developing chick embryos infected with murine typhus was noted by Hamilton and associates.[4] In the first clinical investigation Yeomans and associates[5] treated 20 patients with louse-borne typhus with para-aminobenzoic acid in Cairo, Egypt, and used alternate patients as controls; the daily dose of the drug ranged between 24 and 28 Gm. and an attempt was made to attain a blood level ranging between 10 to 20 mg. per cent. These investigators noted that the average duration of fever for the forty-four untreated patients was 18.5 days, whereas in twenty patients treated with para-aminobenzoic acid the average duration of fever was 12.5 days. In commenting on their results, Yeomans and associates pointed out that among the group of forty-four untreated patients there was only one mild case and that the fatal cases were 18 per cent of the total, while on the other hand there were eleven mild cases and no deaths in the group who received para-aminobenzoic acid. The average duration of hospital stay for the treated patients numbered twenty-one days while that of the untreated patients was thirty-two days. These authors concluded that para-aminobenzoic acid lessens the severity of louse-borne typhus and emphasized that early initiation of therapy, preferably before the third day, was extremely important.

The extension of clinical and experimental investigation to determine whether para-aminobenzoic acid exerted any rickettsiostatic activity against other types of rickettsia constituted a logical extension of this field of investigation. Tierney[6] treated eighteen patients with tsutsugamushi disease with para-aminobenzoic acid and used sixteen alternate patients as controls. He reported that the great majority of patients receiving para-aminobenzoic acid had mild courses and there were no deaths in this group; of the untreated group, however, three died and seven were critically ill. Tierney concluded that para-aminobenzoic acid exerted a beneficial effect on the course of tsutsugamushi disease and similarly emphasized the importance of early treatment, i.e., before the first week.

Smith,[5] employing a dose of 2 Gm. every two hours, treated twenty-nine patients with endemic typhus and used twenty-nine other patients as controls; the two groups were thought to be roughly comparable on admission. There

was one fatality in each series and this author concluded that patients who received para-aminobenzoic acid progressed more favorably and followed a more benign course than the untreated cases. The duration of fever in the treated cases was 10.3 days while that in the untreated cases was 13.2 days.

Regarding the antirickettsial activity of para-aminobenzoic acid in Rocky Mountain spotted fever, Anigstein and Bader[10] in 1945 demonstrated that when guinea pigs were experimentally inoculated with spotted fever, about 80 per cent of those animals receiving para-aminobenzoic acid recovered while all control animals died. Hamilton[11] reported that para-aminobenzoic acid inhibited spotted fever rickettsia in developing chick embryos to an even greater extent than murine typhus. In the first reported instance of the treatment of Rocky Mountain spotted fever in human beings with para-aminobenzoic acid, Rose and associates[12] discuss its use in a 46-year-old woman; the drug was instituted on the fifth day of the disease in a dose of 4 Gm. initially and 2 Gm. every two hours thereafter. A prompt recovery ensued. The para-aminobenzoic acid blood levels in this case ranged between 6.6 and 18.6 mg. per cent.

During the summer of 1946, all six patients with Rocky Mountain spotted fever diagnosed at Children's Hospital had been treated with para-aminobenzoic acid. Ideally, it would have been desirable to have treated alternate cases with this drug employing the untreated cases as controls. However, the number of subjects were too few to allow any such control series. Two additional cases in adults were treated by one of us (P. A. M.) and will also be described.

Powdered para-aminobenzoic acid was partially dissolved in 5 per cent bicarbonate of soda solution so that 15 c.c. of the mixture contained one gram of para-aminobenzoic acid. This preliminary neutralization lessened gastric irritation and the drug was well tolerated by the patients.

CASE REPORTS

CASE 1.—D. B., a 4 year-old white female, was admitted to Children's Hospital on July 29, 1946, with the complaints of malaise and fever for seven days' duration and a rash of five days' duration.

The child had been perfectly well until one week prior to entry, at which time she was noted to have become listless and feverish. Forty-eight hours after the onset of the fever a rash appeared, which had its initial distribution about the feet and ankles and progressed so that during the next two or three days there was a generalized distribution over the trunk, chest, and upper extremities. Concomitantly, the child complained of headache and muscular aches and pains in the upper and lower extremities and experienced considerable malaise. The appetite was poor and the child vomited on one occasion. The temperature remained elevated during the entire week prior to entry and the child during this interval appeared acutely ill.

The patient resided on a farm near Potomac Mills, Va. Ticks had been noted in this area and during the earlier part of the spring had been observed on the child and removed but none had been noted recently.

The past history and family history were noncontributory to the present illness.

Physical examination at the time of entry revealed a well-developed, well-nourished 4-year-old white girl who appeared acutely ill but in no obvious distress. Her temperature was 104.8° F., the pulse rate 140, and the respiratory rate 40. Her sensorium was clear but she appeared very irritable and was uncooperative. A discrete, maculopapular rash which blanched

on pressure was noted chiefly on the upper and lower extremities and the trunk There were a few scattered lesions on the palms and soles No ticks were found in the hairy regions The posterior cervical axillary, and inguinal nodes were small and shotty The neck was supple and Kernig's and Brudzinski signs were negative The heart and lungs were normal The liver and spleen were not palpable The motor and sensory modalities were in good order. Physical examination was otherwise negative

In view of the clinical findings together with the known concentration of ticks in this area a provisional diagnosis of Rocky Mountain spotted fever was made.

Laboratory examination revealed a hemoglobin of 10 Gm with 3 5 million red cells, the white cell count was 8,400 with 55 per cent neutrophiles, and 45 per cent lymphocytes The urinalysis was essentially negative Blood culture was negative as was the Wassermann and Kahn Weil Felix agglutination test with Proteus OX19 on July 29, eight days after the onset of illness was positive in a dilution of 1 20. Five days later the titer had risen to 1:640

Throughout the first two days in the hospital the child remained acutely ill with the temperature spiking between 100° and 104 5° F Drowsiness and irritability were marked and the child's appetite remained poor The rash had become more petechial, and involved the entire thorax and abdomen During this time supportive measures including antipyretics and an intravenous infusion of 300 c c of 5 per cent glucose in saline were administered

On July 31, forty eight hours after admission, para aminobenzoic acid therapy was started The dose was 3 Gm initially and then 1½ Gm every two hours thereafter On the following day, the dose of para aminobenzoic acid was reduced to 1 Gm every two hours, and this dosage was maintained throughout the remainder of therapy. Frequent para aminobenzoic acid blood levels were taken one hour following the previous dose and revealed the blood level to range between 16 and 24 mg per cent (Chart 1).

Two days following initiation of para aminobenzoic acid therapy a rather definite improvement was noted The patient appeared less toxic, was considerably more alert and her appetite improved However, the temperature continued to spike during the next five days, ranging between 100° and 102° F On the sixth day of para aminobenzoic acid therapy the temperature dropped rapidly to normal By this time the rash had already begun to fade and the patient was asymptomatic The child remained afebrile during the remainder of her hospital course Her recovery was complete and she was discharged on the seventeenth hospital day after an uneventful convalescence

Para aminobenzoic acid had been administered for ten days, during which time the child received a total of 110 Gm

Daily white counts obtained during the course of drug therapy to determine its leucopenic effect revealed a definite granulocytopenia and leucopenia one week after the initiation of para aminobenzoic acid therapy; the white count at this time was 3,500 with 16 per cent neutrophiles. However, the white count rapidly returned to normal when the para aminobenzoic acid was discontinued. Hepatic function tests obtained during the course of para aminobenzoic acid therapy showed a prothrombin time of 50 per cent of normal, total protein of 6 9 Gm per cent and a 4+ cephalin flocculation test.

CASE 2.—S H., a 7 year old white male, was admitted to Children's Hospital on June 30, 1940, with the chief complaint of fever of six days' duration and rash of two days' duration

The child had been in good health until one week prior to entry, at which time a temperature elevation was observed The temperature remained elevated during the whole week prior to entry and during this time the patient was rather listless, irritable and showed some degree of anorexia Two days prior to entry, a maculopapular rash was noted which started on the extremities and then extended centripetally to involve the trunk and thorax. There had been no instance of tick bites as far as known

The past history and family history were noncontributory

Physical examination revealed a well developed child who appeared moderately apprehensive but not acutely ill Positive findings included a fine maculopapular rash on the face

nd extremities with a minimal number of lesions on the body: a few of the lesions were petechial in character. There was a moderate degree of cervical adenopathy and mild conunctivitis. The liver and spleen were barely palpable. There was a moderate degree of meningismus present with 2+ nuchal rigidity and positive Kernig and Brudzinski signs. Temperature was 104° F., pulse 100, respirations 33. The physical examination was otherwise not remarkable. A provisional diagnosis of Rocky Mountain spotted fever was made.

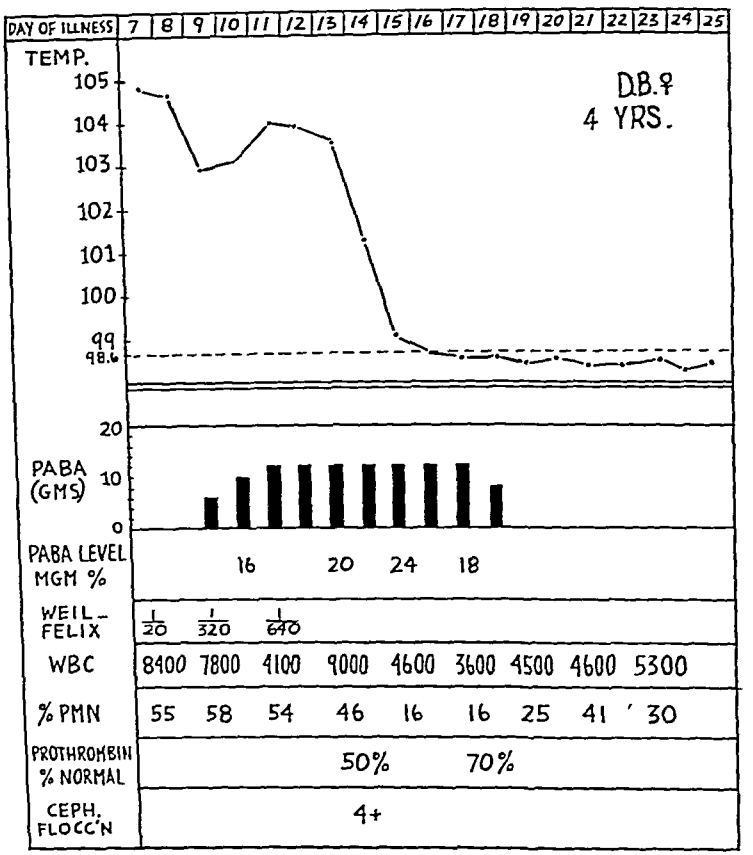


CHART 1

The laboratory examination showed a hemoglobin of 11 Gm. with 3.56 million red cells; the white cell count was 7,350 with 79 per cent neutrophiles, 19 per cent lymphocytes, and 2 per cent monocytes. The urinalysis was negative. Blood culture and spinal fluid examination were negative. Weil-Felix agglutination test with Proteus OX19 was done on June 30, seven days after the onset of illness, and was negative. Ten days later the titer had risen to 1:2,560 and a complement fixation test was positive in a dilution of 1:128.

On the day following admission, para-aminobenzoic acid therapy was started with a dosage of 2 Gm. every two hours, and this dosage was maintained for the next ten days, during which time the patient received a total of 220 Gm. of the drug. Supportive therapy consisted of a high protein intake with adequate vitamin supplements; no intravenous fluids were administered. Frequent para-aminobenzoic acid determinations revealed the blood level to range between 20 and 46.6 mg. per cent.

One day after therapy was begun the child appeared somewhat improved clinically with less hyperesthesia and some improvement in appetite was noted. The temperature continued to spike during the next four days but concomitantly there was a gradual defervescence of fever noted during this time (Chart 2). On the fifth day after therapy was begun, the temperature had returned to normal, the meningismus had disappeared and the rash had begun to fade. The patient was discharged after an uneventful convalescence on the twelfth day. No leucopenia resulting from para aminobenzoic acid therapy was observed.

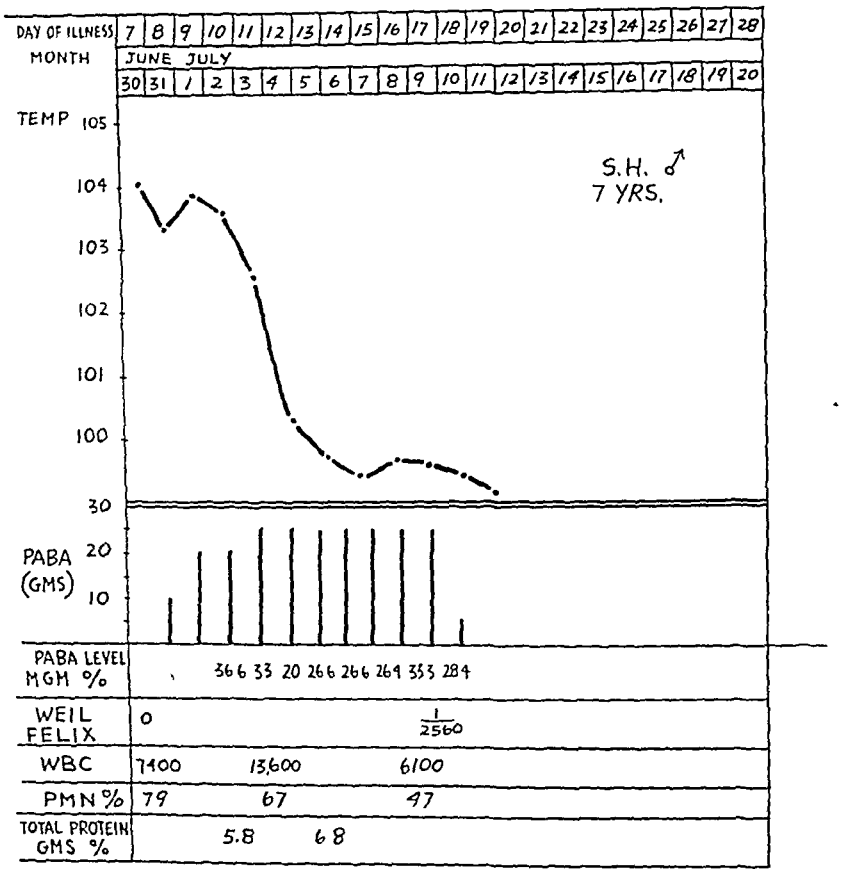


CHART 2

CASE 3.—D. V., a 16 month old white female, was admitted to Children's Hospital on Aug. 8, 1946, with a history of a tick bite six days prior to admission. The child seemed well until one day before entry, at which time she appeared irritable and fever was observed. On the day of admission a maculopapular rash was noted on the extremities and the abdomen. The past history and family history were noncontributory.

Physical examination revealed a well developed, irritable child who appeared acutely ill. A diffuse, pale pink, maculopapular, spotted eruption was noted over the entire body, including the face and extremities. A moderate degree of conjunctivitis was noted. The liver and spleen were not palpable, and no meningismus was elicited.

Laboratory examination revealed a hemoglobin of 10 Gm.; the white cell count was 10,600 with 58 per cent neutrophiles, 38 per cent lymphocytes, and four per cent monocytes.

The urine was negative and the blood culture was sterile. The Weil-Felix agglutination test with Proteus OX19 on August 9, three days after the onset of the illness, was negative; eight days later the titer had risen to 1:80 and a repeat agglutination test twenty-two days after admission showed a titer of 1:640. The total protein was 6.5 Gm. per cent and the prothrombin time was 70 per cent of normal. The cephalin flocculation test six days after entry was 3+.

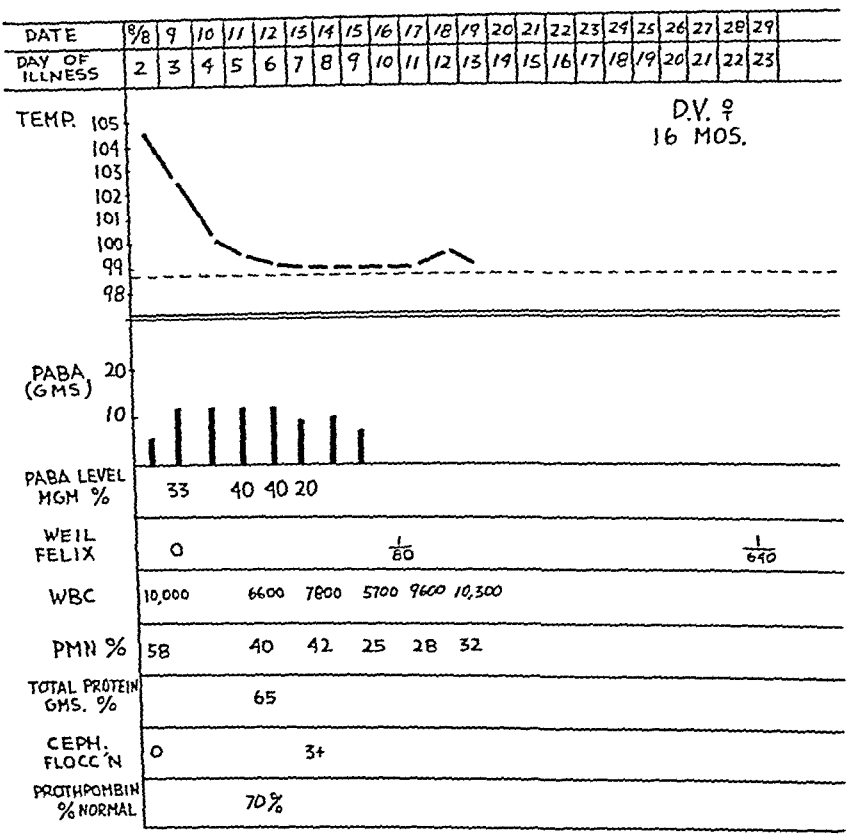


CHART 3

On the day of admission, para aminobenzoic acid therapy in a dose of 2 Gm. initially and one gram every two hours thereafter was started and this dosage was maintained throughout the remainder of therapy. The drug was continued for eight days, during which time the child received a total of 74 Gm. Repeat para aminobenzoic acid blood levels obtained during therapy showed a level ranging between 20 and 40 mg per cent.

Within forty eight hours after initiation of therapy the temperature dropped precipitously to normal and the child remained afebrile during the remainder of her hospital stay (Chart 3). Coincident with the drop in temperature, the patient's clinical improvement was noteworthy and the rash began to fade on the fifth hospital day. The child was discharged on the twelfth day after an uneventful convalescence.

A slight leucopenic effect was observed on the seventh day of therapy, the white cells dropping to 5,700 with 25 per cent polymorphonuclears; the white count promptly rose to 9,600 two days following termination of therapy.

One day after therapy was begun the child appeared somewhat improved clinically with less hyperesthesia and some improvement in appetite was noted. The temperature continued to spike during the next four days but concomitantly there was a gradual defervescence of fever noted during this time (Chart 2). On the fifth day after therapy was begun, the temperature had returned to normal, the meningismus had disappeared and the rash had begun to fade. The patient was discharged after an uneventful convalescence on the twelfth day. No leucopenia resulting from para aminobenzoic acid therapy was observed.

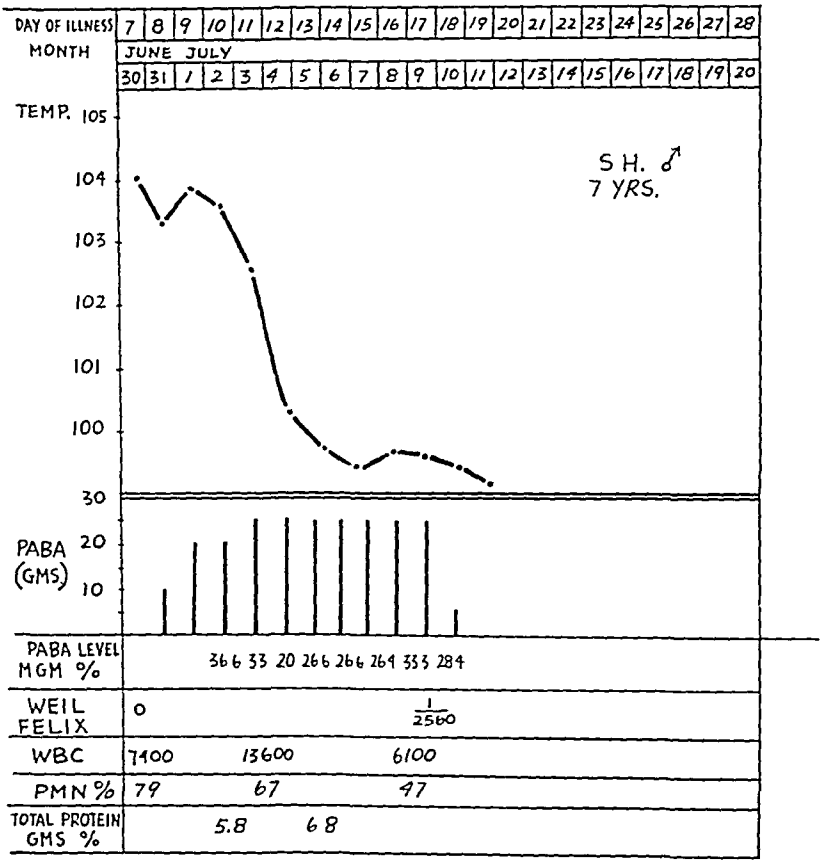


CHART 2

CASE 3.—D. V., a 16 month old white female, was admitted to Children's Hospital on Aug. 8, 1946, with a history of a tick bite six days prior to admission. The child seemed well until one day before entry, at which time she appeared irritable and fever was observed. On the day of admission a maculopapular rash was noted on the extremities and the abdomen. The past history and family history were noncontributory.

Physical examination revealed a well developed, irritable child who appeared acutely ill. A diffuse, pale pink, maculopapular, spotted eruption was noted over the entire body, including the face and extremities. A moderate degree of conjunctivitis was noted. The liver and spleen were not palpable, and no meningismus was elicited.

Laboratory examination revealed a hemoglobin of 10 Gm.; the white cell count was 10,600 with 58 per cent neutrophiles, 38 per cent lymphocytes, and four per cent monocytes.

The urine was negative and the blood culture was sterile. The Weil-Felix agglutination test with Proteus OX19 on August 9, three days after the onset of the illness, was negative; eight days later the titer had risen to 1:80 and a repeat agglutination test twenty-two days after admission showed a titer of 1:640. The total protein was 6.5 Gm. per cent and the prothrombin time was 70 per cent of normal. The cephalin flocculation test six days after entry was 3+.

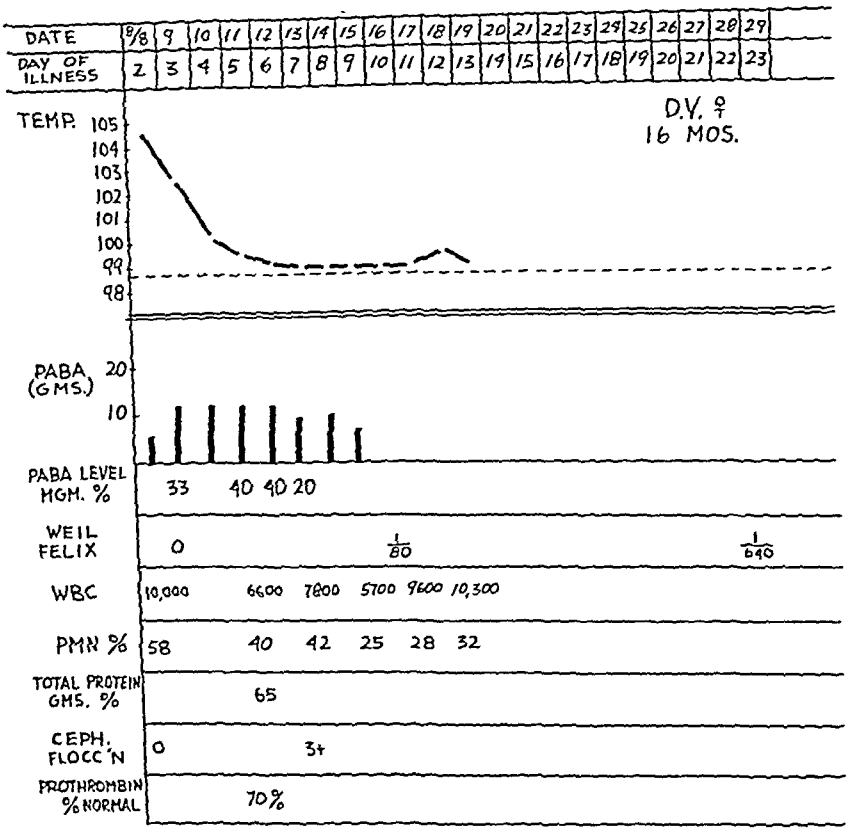


CHART 3

On the day of admission, para-aminobenzoic acid therapy in a dose of 2 Gm. initially and one gram every two hours thereafter was started and this dosage was maintained throughout the remainder of therapy. The drug was continued for eight days, during which time the child received a total of 74 Gm. Repeat para-aminobenzoic acid blood levels obtained during therapy showed a level ranging between 20 and 40 mg. per cent.

Within forty-eight hours after initiation of therapy the temperature dropped precipitously to normal and the child remained afebrile during the remainder of her hospital stay (Chart 3). Coincident with the drop in temperature, the patient's clinical improvement was noteworthy and the rash began to fade on the fifth hospital day. The child was discharged on the twelfth day after an uneventful convalescence.

A slight leucopenic effect was observed on the seventh day of therapy, the white cells dropping to 5,700 with 25 per cent polymorphonuclears; the white count promptly rose to 9,600 two days following termination of therapy.

CASE 4.—S. W., a 9 year old Negro male, was admitted to Children's Hospital on July 21, 1946, with the chief complaints of fever and listlessness of one week's duration and a rash of four days' duration.

The child was well until one week prior to entry, at which time he began to run a fever and seemed unduly fatigued. At this time he was seen by a private physician and was given sulfadiazine for an indeterminate period. The temperature remained elevated during the entire week prior to entry. Four days after the onset of fever, a rash appeared, which had its initial distribution about the upper and lower extremities. Associated complaints included headache, anorexia, muscular aches and pains in the upper and lower extremities. There was no definite history of tick bite elicited

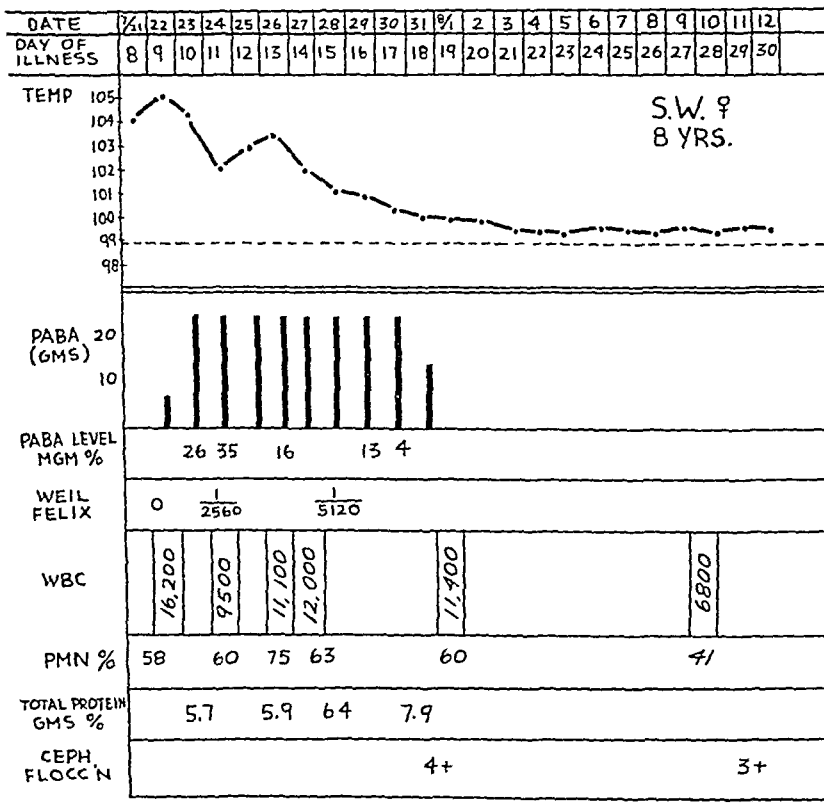


CHART 4

Physical examination revealed a well-developed, poorly nourished, Negro male who appeared acutely ill. There was a faint maculopapular and petechial rash diffusely distributed over the trunk and abdomen. No nuchal rigidity or cervical adenopathy was noted. The pharynx was markedly inflamed and the tonsils were enlarged and cryptic. The spleen and liver were both palpable about 1 fingerbreadth below the costal margin. The Brudzinski sign was positive bilaterally and the deep reflexes were absent. Temperature was 103.2° F., pulse 140, and respirations 40.

Laboratory examination revealed a hemoglobin of 9 Gm. with 3 million red cells; the white cell count was 16,200 with 58 per cent neutrophiles and 32 per cent lymphocytes. Urinaly-

sis showed 120 mg of albumin with an occasional hyaline cast, however, repeat subsequent urines were negative. A blood culture was negative. Spinal fluid examination revealed sixty white cells with 40 per cent neutrophiles and 60 per cent lymphocytes; the spinal fluid sugar and protein were within normal limits. Total protein was 5.66 Gm. per cent and the cephalin flocculation test was 4+. The Weil Felix agglutination test with Proteus OX19 on the second day after entry (nine days after the onset of illness) was negative. However, three days later the titer had risen to 1:2,560 and within another five days a further rise to 1:5,120 was noted; the complement fixation test for Rocky Mountain spotted fever at this time was 1:640.

On the day of admission, the patient was started on penicillin therapy, 50,000 units every three hours intramuscularly. On the following day, however, the child appeared considerably worse, the temperature had risen to 105° F., a definite petechial rash was observed on the hands and feet, and the child appeared semicomatose. On the second day, sulfadiazine was administered by clysis but was discontinued within twenty four hours when the diagnosis of Rocky Mountain spotted fever became more apparent.

On the third hospital day, or ten days after the onset of the disease, para aminobenzoic acid therapy was begun (Chart 4). The dosage was 3 Gm. every three hours or 24 Gm. per day and drug therapy was maintained for nine days for a total of 187 Gm. The para amino benzoic acid level ranged between 4 and 35 mg. per cent. Supportive therapy included blood transfusions as well as crystalloids and amigen infusions.

Within three days after para aminobenzoic acid therapy was started, the patient showed some improvement, his sensorium began to clear somewhat and the child appeared to be more responsive to his surroundings. During the first six days after the initiation of the drug, however, the temperature remained constantly elevated ranging between 101° to 102° F. The fever came down by lysis thereafter and during the second week remained around 100° F. Within eleven days after the onset of therapy, the temperature had come down to normal, the total duration of fever being nineteen days. He was discharged after a complete recovery on the thirtieth hospital day.

No leucopenic effect was observed during the course of therapy.

CASE 5.—J. L. M., a 4 year old white male, was admitted to the hospital on the eighth day after the onset of his illness. The temperature on admission was 104.5° F. and the child appeared quite toxic and dehydrated. There was a diffuse, petechial rash covering the extremities and trunk. A clinical diagnosis of Rocky Mountain spotted fever was made and subsequently confirmed by a Weil Felix agglutination titer of 1/2,560.

Para aminobenzoic acid therapy was begun on the day of admission with an initial dose of 3 Gm. and 1½ Gm. every three hours thereafter. Some improvement was noted during the next three days while on therapy, the temperature dropping to normal during this interval. However, on the fourth hospital day, the patient became mildly incoherent and confused and a moderate degree of periorbital and peripheral edema was observed. Concomitantly the temperature again rose and the child appeared definitely worse (Chart 5). The para amino benzoic acid blood level ranged between 33 and 80 mg. per cent at this time, and because of the uncertainty regarding the possible toxic effects of the drug as a contributing cause, it was discontinued. Shortly thereafter the child became comatose with evidence of peripheral shock. On the eighth hospital day, a bilateral parotid swelling was observed; at this time a history of possible exposure to mumps two weeks prior to entry was elicited from the parents. A spinal tap was performed on the following day and was negative. Two days later, definite evidence of the right lower lobe pneumonia was demonstrable both on physical examination and on x-ray.

The patient's condition remained critical during the next few days, during which time the temperature fluctuated between 102 and 104° F., and the rash became markedly hemorrhagic and diffuse. Supportive therapy consisted of penicillin, oxygen, and intravenous infusions of crystalloids and blood. Improvement was gradual but progressive and the tem

perature came down by lysis during the course of the next two weeks. The child was discharged on the thirty second hospital day after a complete recovery.

No leucopenic effect was observed during the time para-aminobenzoic acid was administered.

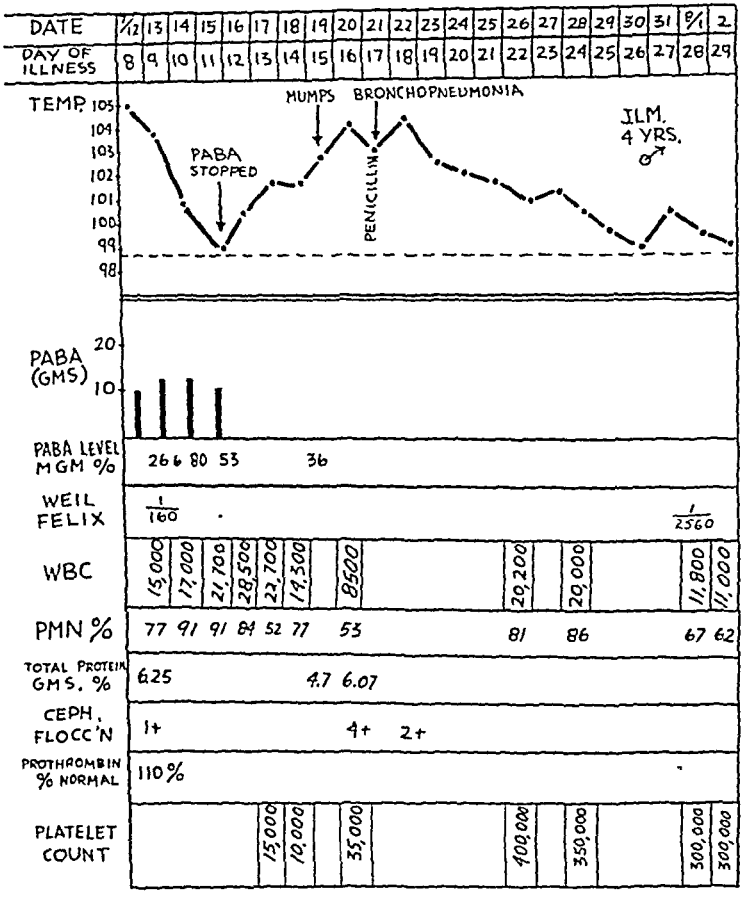


CHART 5

CASE 6.—C. C., an acutely ill, 11 year old white male, was admitted to the hospital on the sixth day of his illness with clinical findings suggestive of a diagnosis of tick fever; a Weil-Felix agglutination titer of 1/2,560 was subsequently obtained (Chart 6). Para-aminobenzoic acid therapy was started on the third hospital day, or eight days after the onset of the disease, in a dosage of one gram every two hours; two days later, the dose of para-aminobenzoic acid was increased to 2 Gm. every two hours because of the relatively low para-aminobenzoic acid blood level (3.4 mg. per cent). The blood level rose on the following day and ranged between 27 and 40 mg. per cent, prompting a return to the original dosage schedule during the remainder of therapy. In all, para-aminobenzoic acid was maintained for nine days, during which time 104 Gm. of the drug were administered.

During the first five days of therapy the patient showed progressive improvement. The temperature, which on entry was 104° F., came down by lysis, and the child appeared con-

siderably less toxic. However, on the sixth day, the temperature again rose to 103° F. and the child appeared quite disoriented and semicomatose. A bilateral, tender, parotid swelling and edematous Stenson's duct at this time was noted and on close questioning of the parents, a history of exposure to mumps ten days prior to admission was obtained. A spinal tap showed 36 white blood cells with 60 per cent polymorphonuclears and 40 per cent lymphocytes; the

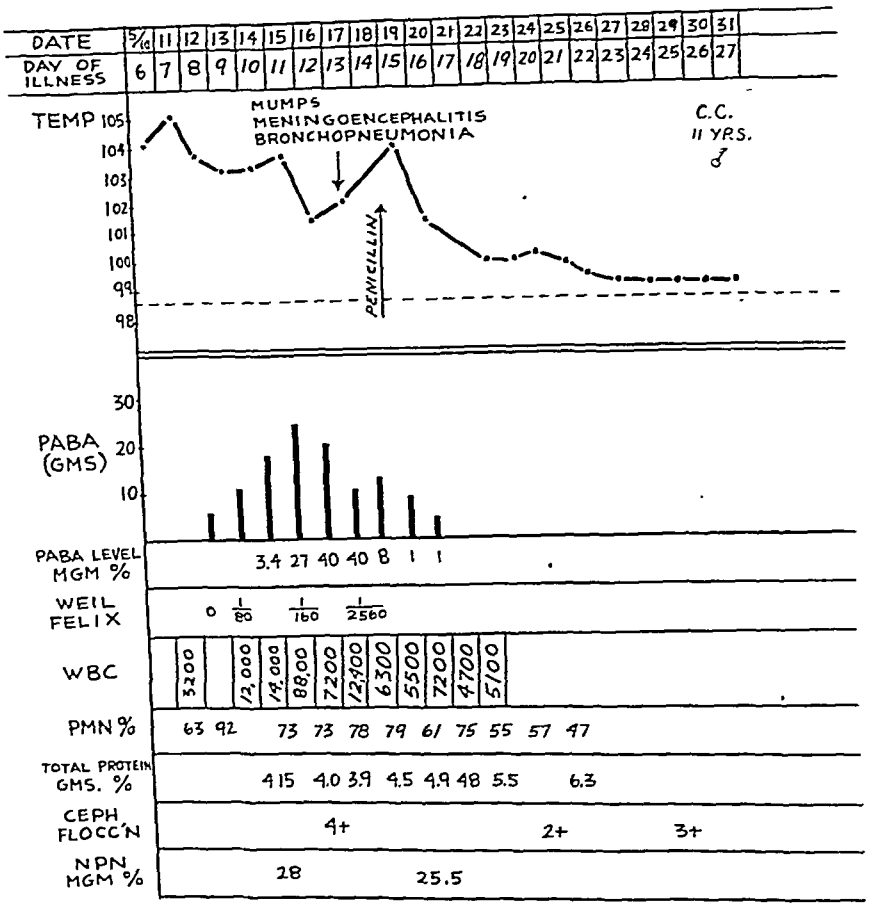


CHART 6

sugar and protein were within normal limits. Spinal fluid findings were interpreted as evidence of a complicating mumps meningoencephalitis. The possibility that the spinal fluid pleocytosis was related to the tick fever rather than mumps was thought to be unlikely in view of the normal lumbar puncture findings noted at the time of admission to the hospital. A complement fixation test for mumps virus subsequently performed at the National Institute of Health was positive.

On the eighth day the temperature rose to 103.8° F. and definite signs of left lower lobe pneumonia were observed; penicillin therapy was therefore initiated while para-aminobenzoic acid was discontinued. Definite improvement was observed during the next five days with noticeable clearing of the sensorium, defervescence of temperature and resolution of the pneumonic process. The child was discharged on the twenty-first hospital day.

A slight leucopenic effect from para aminobenzoic acid was observed after the patient had been on the drug for nine days, the white blood count at this time was 4,700 with 57 per cent polymorphonuclears The cephalin flocculation test was 4+ on the sixth hospital day and 3- shortly before discharge

CASE 7.—C L a 26 year old white male (husband of patient in Case 8), was also admitted to Alexandria Hospital on July 20, 1946, with the complaints of fever of two days' duration and rash of one day's duration

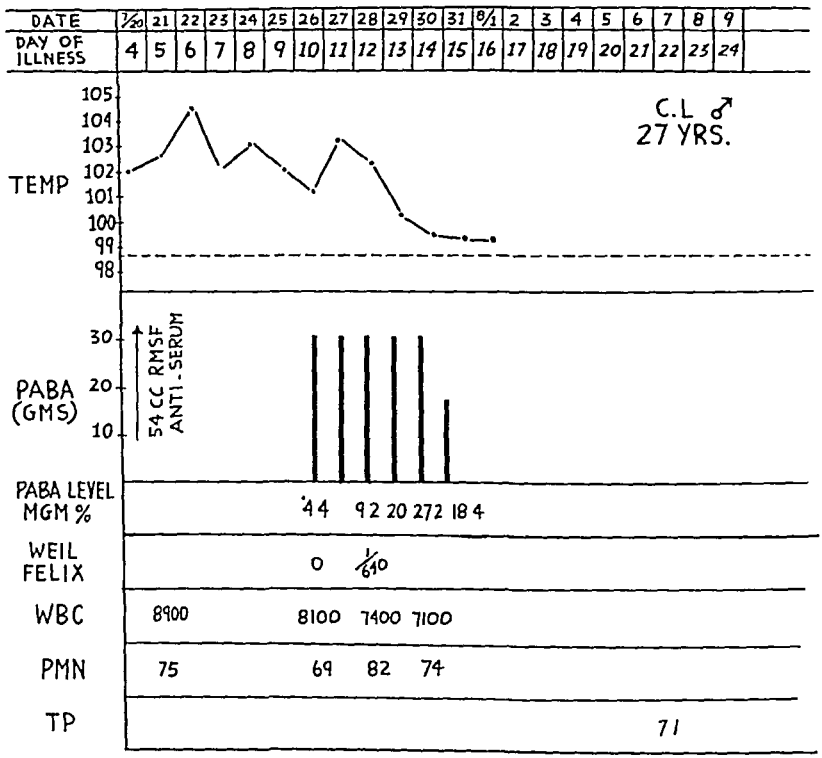


CHART 7

As in the case of his wife, the patient removed a deeply embedded tick from his right shoulder one week before admission Five days later, a fever was noted, accompanied by malaise, chilly sensations, weakness, and muscle aches On the day prior to entry, a faint pink rash which had its initial distribution on the hands, wrists, and ankles was observed

Physical examination revealed a well developed male who appeared moderately ill There was a maculopapular rash present over the entire body but chiefly concentrated about the upper and lower extremities Both plantar and palmar surfaces were involved. Temperature was 102° F, pulse 98, respirations 24, and blood pressure 118/80.

Laboratory examination revealed a hemoglobin of 13 5 Gm with 4 6 million red cells, the white cell count was 8,900 with 75 per cent neutrophiles, and 25 per cent lymphocytes. The urinalysis was negative A positive Rocky Mountain spotted fever complement fixation in a dilution of 1·512 was obtained on the sixteenth day after the onset of illness

On the day of admission, the patient was given 64 c c of tick fever antiserum Transient subjective improvement was observed during the next three days, although the temperature

continued to range between 100° to 104° F. On the fourth day, the patient appeared definitely worse with a marked increase in the hemorrhagic character of the rash and an exacerbation of malaise, drowsiness, muscle aches. On the sixth day, para-aminobenzoic acid therapy was started with an initial dose of 6 Gm. and 4 Gm. every three hours thereafter (Chart 7). Therapy was maintained for five days, during which time the patient received a total of 162 Gm. Daily para-aminobenzoic acid determinations revealed the blood level to range between 4.4 to 30 mg. per cent.

Following initiation of therapy the patient's improvement was gradual but progressive. The temperature came down to normal by lysis within four days and the rash had faded by the sixth day. The patient was discharged on the twelfth hospital day after an uneventful convalescence. No leucopenia resulting from para-aminobenzoic acid was observed.

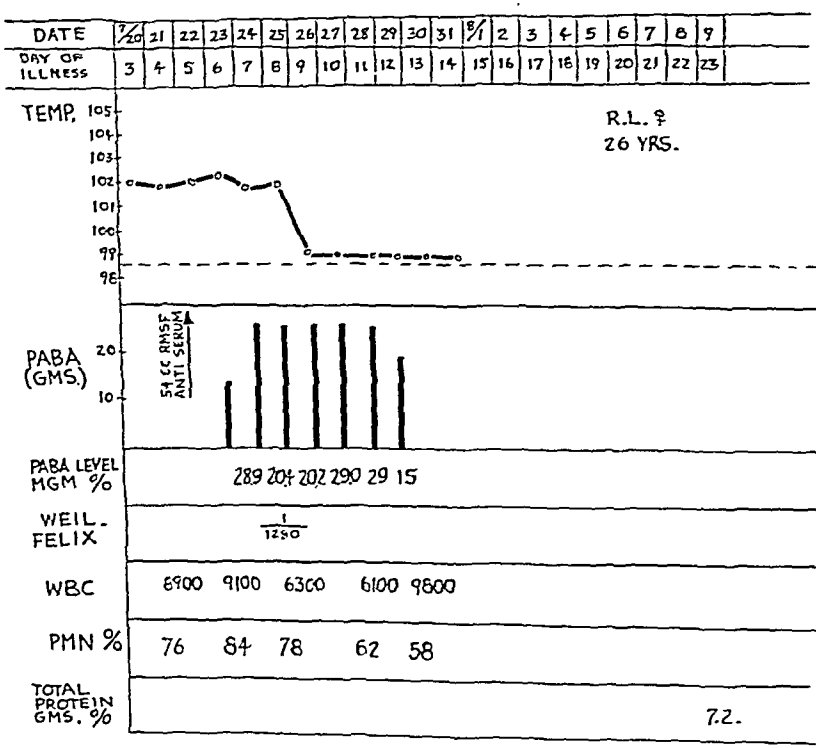


CHART 8

CASE 8.—R. L., a 26-year-old white female, was admitted to Alexandria Hospital on July 20, 1946, with the complaints of fever of two days' duration and a rash of one day's duration.

About eight days prior to entry, the patient found a tick on the back of her neck and removed it without difficulty. Five days later she began to experience some malaise and felt nauseated. On the following day an elevation of temperature was noted and the patient began to complain of muscular aches and pains. On the day before admission, a rash was noted on the hands, feet, and abdomen.

Physical examination revealed a moderately ill female in no apparent distress. There was a diffuse maculopapular rash distributed over the entire body with maximum concentration along both forearms. The pupils reacted sluggishly to light and accommodation and nystagmus

was noted on right lateral gaze; the patient complained of diplopia. Physical examination was otherwise not remarkable. Temperature was 101.6° F., pulse 110, respirations 24, and blood pressure 102/70.

Laboratory examination revealed a hemoglobin of 10.4 Gm. with 3.8 million red cells; the white cell count was 8,900 with 76 per cent neutrophiles, 22 per cent lymphocytes, 1 per cent eosinophiles, and 1 per cent monocytes. The urinalysis was negative as was the blood Kahn and Eagle. Weil Felix agglutination test with *Proteus* OX19 was positive in a dilution to 1:1,280.

On the day of admission, the patient received 54 c.c. of Rocky Mountain spotted fever antiserum. However, no perceptible improvement was noted following its use; the patient continued to complain of severe headache, malaise, and diplopia and the temperature continued to spike between 100° to 102° F. On the fourth day after entry, para-aminobenzoic acid was started. The dose was 6 Gm. initially and 3 Gm. every three hours thereafter; the drug was maintained for the next six days, during which time the patient received a total of 132 Gm. of para aminobenzoic acid. Frequent blood level determinations ranged between 15 and 29 mg. per cent (Chart 8).

Within three days after initiation of para aminobenzoic acid therapy, a definite improvement was observed. The patient's anorexia and subjective discomfort had lessened to a considerable extent. On the third day, the temperature came down to normal and she remained afebrile during the remainder of her hospital stay. The rash had completely faded within the seventh day after para aminobenzoic acid therapy was started. The patient was discharged on the twelfth day after an uneventful convalescence. No leucopenia from the drug was observed.

COMMENT

Our results with para-aminobenzoic acid in Rocky Mountain spotted fever were in effect similar to those obtained by Yeomans,[7] Tierney,[8] and Smith[9] against louse-borne typhus, scrub typhus, and murine typhus, respectively (Table II). The improvement was more gradual than dramatic and the temperature came down by lysis over the course of several days with concomitant improvement clinically. The morbidity, duration of the disease, and degree of toxicity seemed to be modified to a greater or lesser extent in six of the eight patients treated with para-aminobenzoic acid as compared with the thirty untreated patients observed during the previous fifteen years in Children's Hospital (Chart 9). The mortality rate among the untreated group was 10 per cent (three deaths in thirty patients) while in the eight cases managed with para-aminobenzoic acid there were no deaths. Admittedly, the latter series is too small to permit any significant statistical evaluation and only further extensive clinical trials will allow any definite conclusions regarding the efficacy of para-aminobenzoic acid in Rocky Mountain spotted fever. The evidence thus far is suggestive but not conclusive. The response to para-aminobenzoic acid was in no way comparable with the dramatic response of susceptible bacterial infections to sulfonamides and antibiotic drugs. Had therapy been started earlier in these cases, it is possible that a more prompt response might have been observed.

Mode of Action of Para-Aminobenzoic Acid.—The important role assumed by para-aminobenzoic acid in the metabolism of bacteria which multiply outside the cells of the body has been clarified since the advent of sulfonamide drugs; the antagonism between the latter and para-aminobenzoic acid is now well

known. However, rickettsias reside and multiply intracellularly, largely within the endothelial cells of small blood vessels. Para-aminobenzoic acid theoretically must gain access to the organisms located within the cell and, in a manner which is as yet strictly speculative, inhibit the intracellular multiplication of the rickettsia, possibly by virtue of stimulation of the metabolism of the host cells.

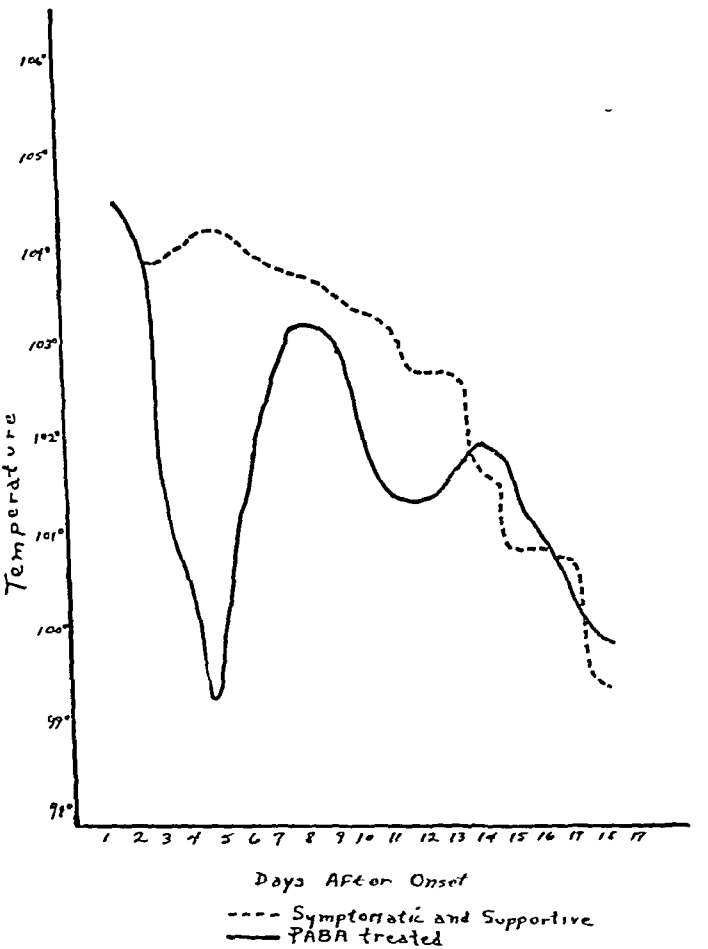


Chart 9.—Comparison between the highest average daily temperatures noted in the eight PABA-treated patients and thirty untreated patients with Rocky Mountain spotted fever.

Grieff and associates[14] hypothesize that either the high metabolic activity of para-aminobenzoic acid on the enzyme system produces an unfavorable milieu for the multiplication of rickettsia within the cell or that enzymes necessary for the growth of rickettsia disappear from the host cells. This would be in keeping with a rickettsiostatic rather than a rickettsiacidal mode of action. That para-aminobenzoic acid does not act directly on the multiplication of rickettsia is inferred from an experiment in which the organisms were exposed to a concentration of 50 mg. per cent of para-aminobenzoic acid without affecting their virulence for animals.[11] Anigstein and Bader[17] have demonstrated that pathological

lesions typical of spotted fever including a large friable spleen and pneumonitis developed in infected guinea pigs even though para-aminobenzoic acid had been administered; they further demonstrated that when the spleen from such animals was injected into susceptible guinea pigs, there resulted a fatal spotted fever infection. In the opinion of these authors the conclusion seemed warranted that para-aminobenzoic acid produces its effect by suppressive rather than destructive action on rickettsiae.

Time of Initiation of Para-Aminobenzoic Acid as Related to the Response to Therapy.—It is generally agreed that the earlier para-aminobenzoic acid therapy is initiated, the better the rickettsiostatic response. In guinea pigs experimentally inoculated with a highly virulent strain of Rocky Mountain spotted fever, Anigstein and Bader[13] found that a progressive delay in initiating para-aminobenzoic acid therapy diminished the efficacy of the drug; these authors considered a forty-eight-hour delay as probably being borderline. Yeomans and associates[7] reported that the best results in louse-borne typhus in human beings were obtained when the drug was started on the second and third days of illness, but observed some effect when the treatment was begun as late as the seventh day. Two-thirds of the cases of tsutsugamushi disease treated by Tierney[8] received the drug not later than the fifth day and no case was started on therapy later than the seventh day of illness. In both of these well-controlled series conducted under the aegis of the American Typhus Fever Commission, patients were hospitalized early and para-aminobenzoic acid therapy was begun shortly thereafter. However, early hospitalization (i.e., within two to three days after onset of fever) is not the rule in sporadic cases of tick fever in civilian practice. Only three of the eight para-aminobenzoic acid treated patients in this series were hospitalized prior to the fourth day, while the other five patients were admitted within the seventh to the tenth day after the onset of illness. Of these, only one patient (Case 3) was started on therapy prior to the sixth day. Any attempt to evaluate the time of initiation of therapy related to the duration of the disease as judged by our results would necessarily be invalid because of the small number of cases in our series. Unquestionably, Case 3, who was started on therapy two days after the onset of the disease, showed the most striking response, with the temperature returning to normal within two days after the initiation of para-aminobenzoic acid therapy. In five other cases where para-aminobenzoic acid therapy was begun within six to ten days after the onset of the disease, the response to therapy was encouraging but not remarkable, with the temperature coming down to normal within an average of six days after initiation of the drug. In the remaining two patients (Cases 5 and 6) both of whom began to receive para-aminobenzoic acid eight days after the onset of the disease, any accurate evaluation of the efficacy of para-aminobenzoic acid therapy was difficult. Both of these patients represented severe examples of tick fever and followed strikingly parallel courses. In Case 5, the drug was discontinued prematurely on the fourth day and a progressive change for the worse in the child's condition occurred, either by coincidence or otherwise, shortly therafter; the picture was further complicated by a superimposed parotitis and bronchopneu-

monia. Similarly, Case 6 was complicated by bronchopneumonia and parotitis (due to mumps) as well as mumps meningoencephalitis. These superimposed infections serve to vitiate any attempt to appraise the effect of para-aminobenzoic acid in both cases. It is worth noting that both children were delirious and comatose at a time when the para-aminobenzoic acid blood levels ranged between 40 and 80 mg. per cent. At the time, it was considered that the marked lethargy and disorientation noted in both children could have been due to any one of three causes, viz., that due to severe tick fever per se, that due to the toxic effects of the drug and third (in Case 6) that ascribable to the complicating mumps meningoencephalitis. As will be discussed later, the studies on ingestion of large doses of para-aminobenzoic acid in a series of six normal children who served as controls would make it appear that the drug was a less likely contributing factor.

As Yeomans and associates[7] have stated, it is apparent that a much wider clinical trial with para-aminobenzoic acid in rickettsial diseases would be required before it would be possible to determine the limits within which salutary effects with the drug may be expected.

Toxicity of Para-Aminobenzoic Acid.—A definite leucopenia and granulocytopenia was found in only one of the eight patients treated with para-aminobenzoic acid. In this patient (Case 1) the white cell count went down to 3,600 with 16 per cent polymorphonuclears on the ninth day of therapy and rose within four to five days following discontinuation of drug therapy. In one other instance (Case 6) a white cell count of 4,700 with 57 per cent polymorphonuclears was noted. No definite correlation was observed between the degree of leucopenia and the para-aminobenzoic acid blood level. It is generally agreed[7-9] that if a leucopenia under 3,000 is observed, it is advisable to discontinue para-aminobenzoic acid therapy. The importance of performing daily white blood cell counts while the drug is being administered is apparent. No change was observed in the red cell count and hemoglobin.

There is no evidence thus far that para-aminobenzoic acid produces any kidney complications in a fashion similar to sulfonamide drugs which, in their chemical configuration, are related to para-aminobenzoic acid. A good urinary output was initiated in all the para-aminobenzoic acid treated cases, to forestall the possibility of producing excessively high blood levels.

In five of the six cases of spotted fever where para-aminobenzoic acid was employed, cephalin flocculation tests were obtained within twelve to nineteen days after the onset of the disease (or within five to twelve days after therapy was initiated) and in all five cases a positive cephalin flocculation ranging between 3 and 4+ were noted. In view of the fact that tick fever per se is capable of producing a pronounced reduction in liver function, there was some question whether the evidence of liver damage presented in these cases represented a dysfunction due to the disease or para-aminobenzoic acid, or both.

In an attempt to evaluate this point, a series of six controls selected at random from the wards, ranging in age between 3 and 11 years, were given 0.33 Gm. of para-aminobenzoic acid per pound of body weight in twenty-four hours

in a three-hour divided dosage schedule for four consecutive days and daily cephalin flocculation tests were obtained. In two instances the cephalin flocculation rose from 0 to 3 and 4+ within twenty-four to forty-eight hours after the initiation of para-aminobenzoic acid. In the other two cases the cephalin flocculation increased from a control 2+ to 4+ within the same interval (Table I).

TABLE I. CONTROL GROUP RECEIVING PABA*

DAYS AFTER PABA STARTED	MG. % PABA	PLATELETS	PROTHROMBIN (% NORMALCY)	CEPHALIN FLOCCULATION†	CARBON-DIOXIDE COMBINING POWER
1	15	319,000	109	0 to 4+	
2	26	352,000	103	3+ to 4+	
3	32	347,000	99	3+ to 4+	
4	37	240,000	77	3+ to 4+	36
		PABA discontinued			
6					45

*Summary of a control group of six normal children selected at random from the ward who received 0.33 Gm. of PABA per pound of body weight per twenty-four hours in a three-hour divided dosage schedule for four consecutive days. PABA levels, platelet counts, and prothrombin determinations were obtained daily on each of the six children while the cephalin flocculation tests were obtained daily on four. The carbon-dioxide combining power was done only on the fourth and sixth day of the experiment. The average of the six daily determinations in each category are noted above.

†Cephalin flocculation tests obtained prior to the administration of PABA were negative in two cases and 2+ in two others.

In a similar group of six controls receiving the same dose of para-aminobenzoic acid, daily prothrombin time determinations were obtained. It was found that the prothrombin level dropped gradually from an initial average of 109 per cent to 77 per cent of normalcy within four days. The results obtained in this control group are suggestive but by no means conclusive that para-aminobenzoic acid may exert some untoward effect on liver function. Further control studies, however, would be indicated before any categorical statement could be made. It might be well to add that in view of the fact that para-aminobenzoic acid is largely conjugated with glycine by the liver to produce para-aminohippuric acid, the possible dangers of administering the drug in the presence of a liver already damaged by spotted fever also requires further clarification.

In this regard platelet counts performed daily in the control group showed no significant reduction during the four-day period that para-aminobenzoic acid was administered.

Carbon-dioxide combining powers were also obtained in each of six cases in this control series on the fourth day of drug ingestion (Table I). Levels ranging from 28 to 44 volumes per cent with an average of 36 volumes per cent were noted. No acidotic dyspnea was noted. Two days after discontinuing para-aminobenzoic acid administration the carbon-dioxide combining power rose in all cases but one to levels ranging between 40 and 52 volumes per cent. This reduction in carbon-dioxide combining power ensued in spite of preliminary neutralization with five per cent sodium bicarbonate which was designed to lessen gastric irritation. Although this control series is small, it would seem that para-aminobenzoic acid is capable of producing a moderate transient re-

duction of carbon-dioxide combining power and it is suggested that carbon-dioxide combining power determinations be obtained periodically when the drug is employed to avoid any complicating acidosis. The mechanism of this imposed disturbance in acid-base balance is not clear.

In spite of the relatively high drug levels (up to 54 mg. per cent) attained in this control group, no evidence of drowsiness or lethargy was observed. This serves to suggest that the apathy and disorientation noted in some of the para-aminobenzoic acid treated patients (especially cases 5 and 6) may have been due to the disease rather than the drug. It should be borne in mind, however, that in the face of the evidence noted here, that para-aminobenzoic acid is capable of producing a reduction of the carbon-dioxide combining power there is the possibility that drowsiness and even coma *can* result from para-aminobenzoic acid if severe acidosis supervenes.

Optimal Dose.—The optimal dose of para-aminobenzoic acid requires further experimental and clinical experience. The drug is excreted rapidly in the urine so that at the end of two to three hours only minimal amounts are still detectable in the blood. Hence frequent administration of the drug, preferably on a two-hour dosage schedule, is indicated. Yeomans and associates[7] administered 24 to 28 Gm. of para-aminobenzoic acid orally per day (usually 2 Gm. every two hours) to adults with louse-borne typhus and considered 10-20 mg. per cent to be an adequate blood concentration. Smith[9] used a similar dosage schedule in the management of twenty-nine patients with murine typhus. In Tierney's[8] series of tsutsugamushi disease, para-aminobenzoic acid was administered in dosage of 8 Gm. initially and then 3 Gm. every two hours; on this regimen, blood concentrations of 30 to 60 mg. per cent were achieved within two days and in some cases a blood level ranging between 95 and 150 mg. per cent was attained. Tierney[8] cites one case where an acutely ill patient had two convulsive seizures at a time when he had a para-aminobenzoic acid blood level of 103 mg. per cent; however, these convulsions were thought to have been due to the disease rather than to the drug. There is no definite evidence thus far that such inordinately high doses are necessarily more efficacious than lower doses in Rocky Mountain spotted fever, and until more is known regarding the possible untoward reactions of para-aminobenzoic acid, it is probably the better part of discretion to attempt to maintain a blood level between 20 and 40 mg. per cent. In our series of six cases of tick fever in children ranging in weights from 20 to 80 lbs. we found that 0.33 to 0.5 Gm. per pound of body weight per twenty-four hours in a two-hour divided dosage schedule would usually yield a para-aminobenzoic acid blood level ranging between 15 and 40 mg. per cent. This was confirmed in a control series of six normal children (see Table I). It is well to add that in the control series, a hiatus of twenty-four to forty-eight hours was required to attain the higher levels ranging between 25 and 40 mg. per cent, suggesting that a cumulative process was operative. In agreement with Tierney,[8] we found a considerable variation from patient to patient in blood levels attained with comparable doses. The desirability of performing daily blood levels during therapy is apparent. In our cases, the para-aminobenzoic acid blood levels were routinely obtained one hour after the previously administered dose

TABLE II. SUMMARY OF 8 PATIENTS WITH ROCKY MOUNTAIN SPOTTED FEVER TREATED WITH PARA-AMINOBENZOIC ACID

CASE	AGE (YR.)	WEIGHT (LB.)	DAY OF DISEASE PABA STARTED	DAYS OF FEVER AFTER PBA STARTED	DURATION OF PABA ℞ (DAYS)	MAXIM. PBA LEVEL (MG. %)	TOTAL PABA (GM.)	LOWEST WBC	CEPHALIN FLOCCULATION	PROTHROMBIN TIME (%)	LOWEST TOTAL PROTEIN (GM. %)	MAXIM. PROTEUS OX19	SEVERITY OF CASE	OUTCOME
1. (D.B.)	1	37	9	6	10	24	108	3,600	4+	50	—	1/640	2+	Recovery
2. (S.H.)	7	45	9	5	10	37	202	6,100	—	—	5.8	1/2,560	2+	Recovery
3. (D.V.)	1½	19	2	2	8	40	74	5,700	3+	70	6.5	1/640	1+	Recovery
4. (S.W.)	8	50	10	12	9	35	186	9,500	4+	—	5.7	1/5,120	3+	Recovery
5. (J.M.)	4	31	8	22	4	80	36	8,500	4+	—	4.7	1/2,560	4+	Recovery
6. (C.C.)	11	82	8	11	9	40	104	4,700	4+	—	3.9	1/2,560	4+	Recovery
7. (C.L.)	26	150	10	4	6	27	162	7,100	—	—	7.1	1/640	3+	Recovery
8. (R.L.)	26	130	6	3	7	29	132	6,100	—	—	7.2	1/1,280	2+	Recovery

of the drug; this permitted a more uniform evaluation of the level in view of the rapid excretion of para-aminobenzoic acid within two to three hours after administration.

The optimal duration of therapy again is arbitrary pending further clinical trials. In our series, therapy was maintained for an average of seven days and was usually discontinued within two to four days after the temperature returned to normal.

CONCLUSIONS

1. A review of thirty-eight patients with Rocky Mountain spotted fever (thirty-six of which were seen at Children's Hospital), from 1931 to 1946, is presented.

2. In the eight patients with tick fever treated with para-aminobenzoic acid during the summer of 1946 (six children and two adults) it would appear that the degree of toxicity, duration of the disease, and morbidity were favorably modified to some extent when compared with the thirty untreated patients observed during previous years. The mortality rate in the untreated group was 10 per cent while there were no deaths in the eight patients managed with para-aminobenzoic acid. The latter series is too small, however, to permit any definite conclusions.

3. Administration of 0.33 Gm. of para-aminobenzoic acid per pound of body weight in twenty-four hours in a three-hour divided dosage schedule over a period of four days to six normal children in a preliminary control experiment suggested the following conclusions:

a. Para-aminobenzoic acid blood levels ranging between 15 and 36 per cent could be maintained with this dose.

b. Daily prothrombin time determinations and cephalin flocculation tests showed changes suggestive of transient liver dysfunction.

c. The carbon-dioxide combining power was also moderately reduced temporarily by the drug.

We wish to express our sincere appreciation to Dr. E. Clarence Rice for his invaluable assistance with the laboratory procedures.

REFERENCES

1. Badger, L. F., Dyer, R. E., and Rumreich, A.: Pub. Health Rep. U. S. P. H. Service 46: 463, 1931.
2. Cecil's Textbook of Medicine, ed. 5, Philadelphia, 1942, W. B. Saunders Company.
3. Topping, N. H.: M. Clin. North America 27: 722, 1943.
4. Harrell, G. T., Venning, W., and Wolff, W. A.: J. A. M. A. 126: 929, 1944.
5. Snyder, J. C., Maier, J., and Anderson, C. R: Report to the Division of Medical Sciences National Research Council, Dec. 26, 1942.
6. Hamilton, H. L., Plotz, H., and Smadel, J. E.: Proc. Soc. Exper. Biol. & Med. 58: 255, 1945.
7. Yeomans, A., Snyder, J. C., Murray, E. S., Zarafonetis, C. I. D., and Ecke, R. S.: J. A. M. A. 126: 349, 1944.
8. Tierney, N. A.: J. A. M. A. 131: 280, 1946.
9. Smith, P. K.: J. A. M. A. 131: 1114, 1946.
10. Anigstein, L., and Bader, M. N.: Science 101: 591, 1945.
11. Hamilton, H. L.: Proc. Soc. Exper. Biol. & Med. 59: 220, 1945.
12. Rose, H. M., Duane, R. B., and Fischel, E. E.: J. A. M. A. 129: 1160. 1945.
13. Anigstein, L., and Bader, M. N.: Texas Rep. Biol. & Med. 4: 260, 1946.
14. Grieff, D., Pinkerton, H., and Moragues, V.: J. Exper. Med. 80: 561, 1944.
15. Snyder, J. C., cited by Yeomans et al.

THE EFFECT OF TRIMETHYLOXAZOLIDINE DIONE (TRIDIONE) ON THE BLOOD

JEAN P. DAVIS, M.D., AND WILLIAM G. LENNOX, M.D.
BOSTON, MASS.

RECENTLY we have reported the clinical results of administering Tridione to 245 patients of various ages.[1] We also reported promising results with the homologue of this drug, dimethylethyloxazolidine dione, in eleven patients not completely relieved of petit mal by tridione. The beneficial effects of these drugs on the petit mal triad of epileptic seizures are most encouraging.

Because of disturbing reports of reactions in the blood following the use of tridione, including two deaths from aplastic anemia,[2, 3] in the past six months we have examined the blood of all patients taking tridione under our supervision, at monthly intervals. The present report deals with 127 patients and 327 individual examinations. These have been made with the cooperation of the department of clinical pathology at the Children's Hospital in Boston, or by the patient's physician. The examinations have included a total white blood cell count and differential, observation of the adequacy of platelets, and determination of the hemoglobin. The latter has been made by the acid-hematin method, usually with the Haden-Hausser or Sahli-Hellige hemoglobinometer.[4] Red cells were counted when the hemoglobin was considered low. In twenty of these patients, constituting a small control series, counts were made before medication was started. Comparisons have been made only with the average values for this premedication group. The number of counts obtained is considered too small, and the range of error too great for analysis of these figures in greater detail.

The ages of the patients range from 8 months to 50 years. Distribution of ages are: less than 2 years of age, 3 per cent; 2 to 4 years, 6 per cent; 4 to 8 years, 23 per cent; 8 to 12 years, 21 per cent; and above 12 years of age, 46 per cent. 65 per cent fall between the ages of 4 and 16 years. Because less than 10 per cent of patients are under 4 years of age, the findings in the entire group are compared with the standards used for adults.[5]

A comparison of the average blood findings in patients (before and during tridione medication) and in normal adults is shown in Fig. 1. Although patients both before and during medication have had low hemoglobin values, the difference between the two groups is not significant. Only 3 per cent of patients taking tridione have had values below 11 Gm., none has been below 9.9 Gm., and none has evidenced an abrupt fall, even among those who have experienced leucopenia.

There has been no decline in the platelet count of any of the patients, and none of the series has observed increasing bleeding or bruising tendencies while taking tridione.

From the Department of Neurology, Harvard Medical School and the Children's and Infants' Hospital of Boston, number L in a series, "Studies in Epilepsy."

The most pronounced changes, as one would expect, have been in the number and proportion of leucocytes. The average number of leucocytes for the entire group of treated patients is 8,300 per cubic millimeter, of which 50 per cent are neutrophiles. This figure is well within the normal range, but slightly lower than that for the premedication group. The cumulative frequency distribution curve of the total white blood counts for this series (Fig. 2) shows a striking parallelism to the range of normal values as compiled from various series of comparable random counts which are reported in the literature.[6]

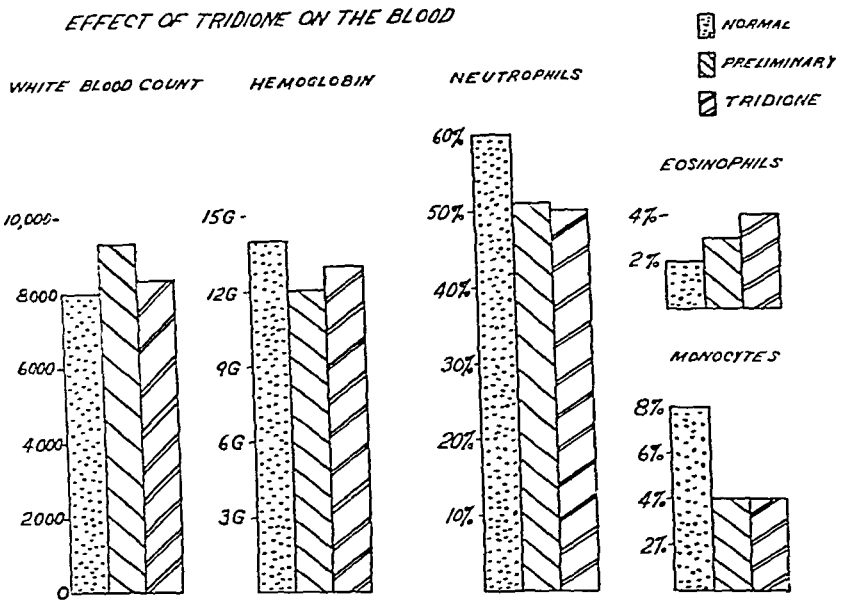


Fig. 1.—The effect of tridione on the blood. The three columns at the left represent the average number of leucocytes in three groups, *namely*, the literature normals (dotted column), preliminary examination of twenty patients (single cross-hatched), and 127 patients taking tridione (double cross-hatched). The second triplet of columns represents the hemoglobin in grams in these three groups. The third group of columns represents the proportion of leucocytes which was neutrophiles. The right end group of columns represents the proportion of eosinophiles and of monocytes in these three groups.

Because the drug in question acts primarily on the granulocytes (neutrophiles or polymorphonuclear cells) produced in the bone marrow, the absolute number of neutrophiles is probably of more significance than either the total leucocyte count or the proportion of neutrophiles to the total.

A spot chart (Fig. 3) comparing the number of neutrophiles with the total leucocyte count demonstrates the relationship between these two values for each of the individual determinations made, before tridione therapy was started and during the course of treatment; the latter include both the group which maintained a satisfactory level of neutrophiles and the 17 patients whose counts were classified as borderline or neutropenic. The 50 per cent average for the patients receiving tridione is definitely lower than the normal average, usually quoted to be approximately 60 per cent. All of the patients with neutropenia or borderline counts fall on or below the 50 per cent diagonal.

The distribution of the total number of neutrophiles per cubic millimeter for the group (Fig. 4) of 127 patients studied is as follows: eight, or 6.3 per cent, have had a definite leucopenia with a total number of neutrophiles below 1,600 per cubic millimeter. The average number per cubic millimeter for this group is 1,265; the lowest is 600. This last value is in a 5-year-old boy who had taken tridione continuously for nine months. An additional nine patients,

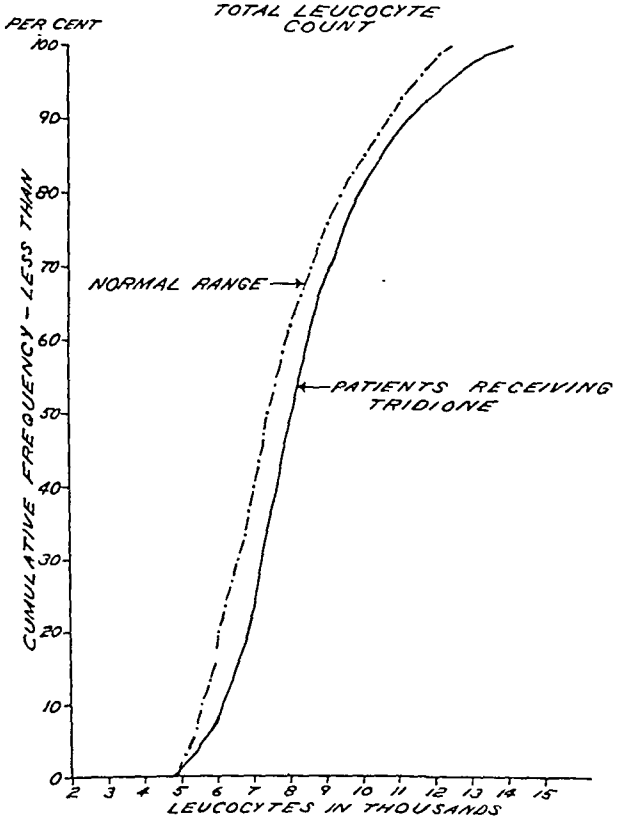


Fig. 2.—Comparison of cumulative frequency distribution curves for the total leucocyte counts of the patients receiving tridione with the average normal range from the literature. Each point on the curve represents the total percentage of counts on the ordinate scale, for which the total number of leucocytes is less than the corresponding value represented on the abscissa.

or 7 per cent, have had borderline values ranging from 1,600 to 2,500 neutrophiles, per cubic millimeter. Thus, a total of 13.3 per cent of patients have had an abnormally low number of neutrophiles, less than 2,500 per cubic millimeter. A further 7 per cent have had counts which might be considered as low normal, ranging from 2,500 to 3,000.

Of the eight patients whose neutrophiles have numbered less than 1,600 per cubic millimeter, two have continued to take tridione, and subsequent values have remained above 2,700 per cubic millimeter. In a third, medication has

been gradually resumed to a full dosage over a period of eight weeks, without recurrence of the neutropenia. Medication has been discontinued in the other five patients with prompt and satisfactory return to a normal number of granulocytes. None of these eight patients has displayed any distinct alteration of the morphology of the neutrophiles.

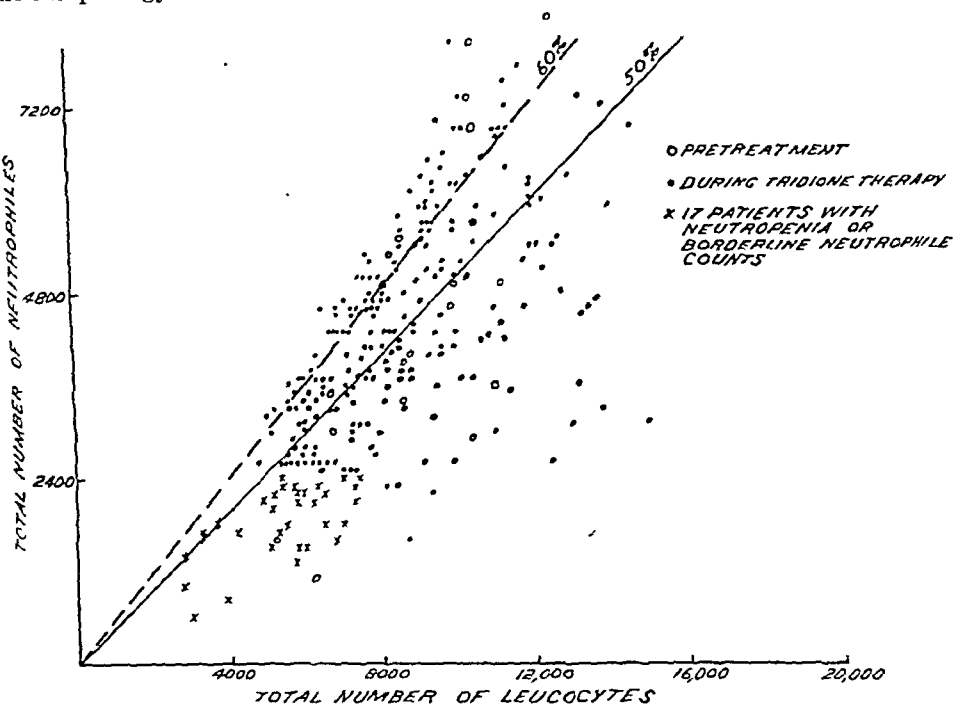


Fig. 3.—A spot chart comparing the total number of leucocytes with the total number of neutrophiles for each individual leucocyte count. The circles represent the values for the pretreatment counts, the dots, the figures for patients receiving tridione, and the crosses, the figures for the seventeen patients with neutropenia, or borderline counts. The scattered dots to the right represent the counts made on the few infants included in the study. The solid line represents the 50 per cent average determined for all counts made on the patients receiving tridione, the interrupted line, the 60 per cent, or normal literature average.

No correlation has been discovered between the occurrence of neutropenia and the age or sex of patients, the dosage of tridione, or interruptions of treatment. Of the 17 patients with neutropenia, 15 per cent had a rash previous to, or coincident with the leucopenia, compared with 37 per cent of the whole series of 127 patients. None of the patients with neutropenia has experienced any clinical symptoms referable to the lowered neutrophile count.

The neutropenia in these eight patients developed from three weeks to twenty months after the institution of tridione therapy, the average being 9.4 months. Five of the eight patients with neutrophiles numbering less than 1,600 per cubic millimeter, and seven of the nine with borderline counts of from 1,600 to 2,500, had blood examinations one month prior to the onset of definite neutropenia. At that time, six of these twelve patients had evidence of a declining neutrophile count.

Cumulative frequency distribution curves of the percentage of the various types of leucocytes in the group studied are compared in Fig. 5 with normal values for the range of leucocyte variations reported in the literature.[7] The average percentage of neutrophiles for the 327 examinations in the entire series of 127 patients is 50 per cent; 36 per cent of the patients have had average counts below this level, and in 12 per cent the average values are below 40 per cent. The values between the fiftieth and ninety-fifth percentile levels are almost identical in the two groups.

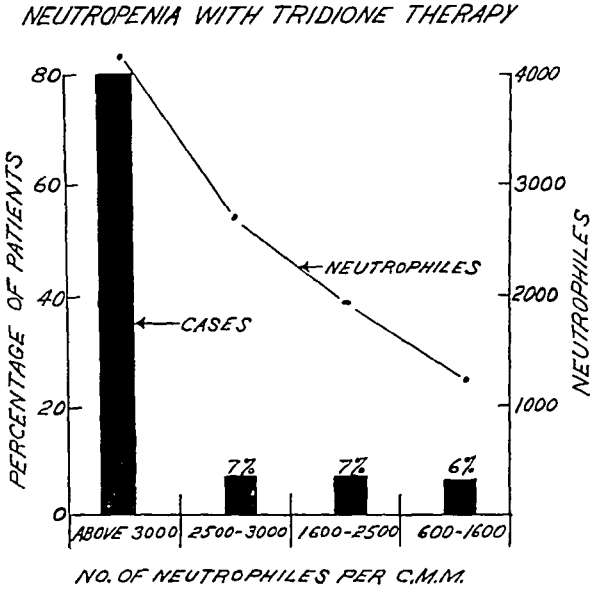


Fig. 4.—Distribution of the total neutrophile counts for 127 patients receiving tridione. The solid column to the left represents the percentage of patients whose total neutrophile counts are above 3,000. The second column, the percentage of patients whose counts range between 2,500 and 3,000, the third column, the percentage of patients whose counts range from 1,600 to 2,500 (the borderline group), and the column on the right, the percentage of patients with definite neutropenia, or neutrophile counts below 1,600 (from 600 to 1,600). The broken line above represents the average number of neutrophiles for each of the four categories, recorded on the scale to the right.

The average percentage of lymphocytes in the group receiving tridione is significantly higher than the percentage considered to be the average "normal" value. The proportion of lymphocytes is 40 per cent or over in 55 per cent of the patients, compared with a proportion of about 13 per cent of "normal" persons. The proportion of lymphocytes is less than 30 per cent in 31 per cent of "normal" persons, and in only eight per cent of patients taking tridione. The fiftieth and ninety-fifth percentile values for the patients are approximately 41 and 60 per cent lymphocytes respectively, compared with about 33 and 44 per cent for the average "normal" range.

Our results, which demonstrate the failure of tridione to alter the total leucocyte count in spite of a decline in the number of circulating neutrophiles, indicate that there may be an absolute increase in the number of lymphocytes. The data suggest that tridione may have a mild but significant stimulatory effect on the lymphocytic series.

The proportion of monocytes in normal persons is believed to be from 5 to 12 per cent. In our patients the proportion is from zero to 12 per cent. In the majority of patients counts tended to be unusually low. Thus, considering

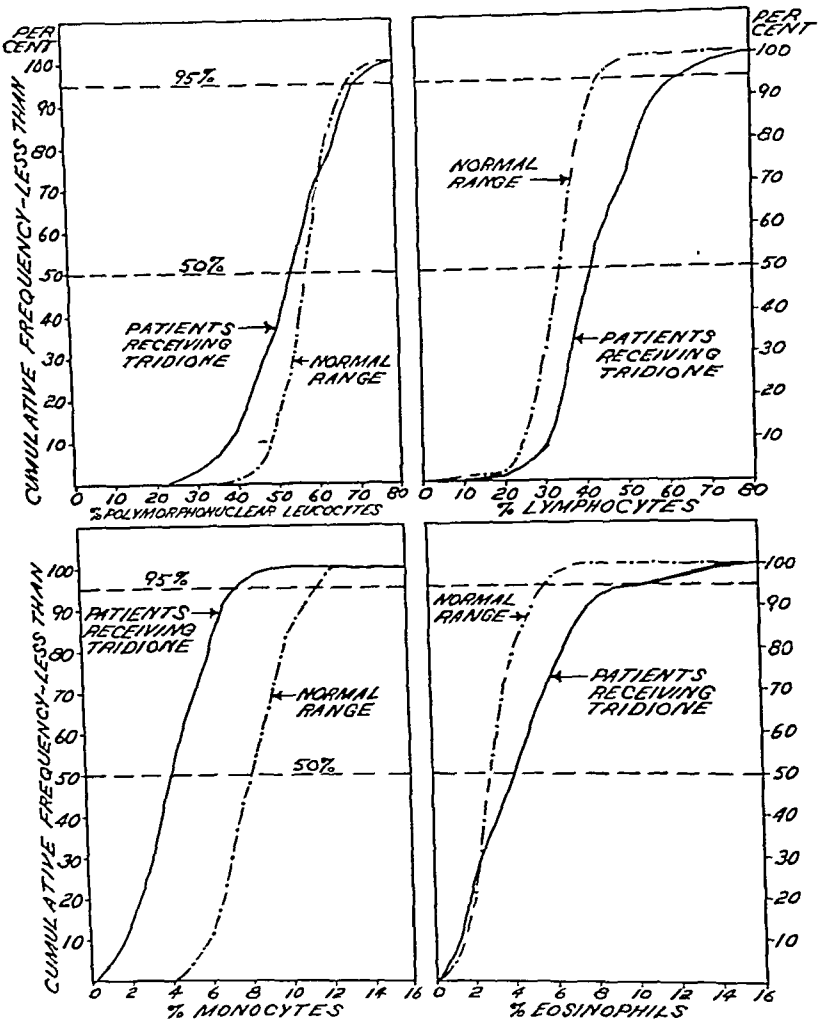


Fig. 3.—Cumulative frequency distribution curves comparing the percentage of polymorphonuclear leucocytes, lymphocytes, monocytes, and eosinophiles of patients receiving tridione with normal values compiled from the literature. The curves are plotted in the same manner as those in Fig. 2.

persons falling in the 50 percentile portion of the curve, the proportion of monocytes is less than 4 per cent in patients taking tridione, and approximately 8 per cent in the "normal" population. Among those in the 95 percentile group, monocytes form less than 8 per cent of leucocytes in the treated group and less than 11 per cent in the "normal" group.

An eosinophilia of 5 per cent or more has occurred at some time in 52 per cent of the treated patients, the maximum being 25 per cent. One-half

the total group have had average values of 3 per cent or below, and one-fourth average values above 6 per cent. Tridione was withheld from nine of the patients whose eosinophilia was 10 per cent or higher (Table I). The eosinophiles averaged 14.8 per cent in this group, and at the time of withdrawal the patients had been taking tridione from five weeks to two years. Because in some of the patients eosinophilia was present at the first examination, the onset of eosinophilia, in relation to the duration of therapy is not known. In eight of the nine patients, from two to six weeks after omission of tridione, the proportion of eosinophiles fell to an average of 6.9 per cent. Therapy was resumed in seven of these patients, and the percentage of eosinophiles rose again to an average of 9.7 per cent in from one to eight weeks. In two of these patients, however, the proportion of eosinophiles did not increase.

TABLE I. STUDY OF EOSINOPHILIA IN NINE PATIENTS RECEIVING TRIDIONE, AND THE EFFECTS OF WITHDRAWAL AND RESUMPTION OF MEDICATION

	EOSINOPHILIA WITH TRIDIONE		PERCENTAGE EOSINOPHILES AFTER WITHDRAWAL OF TRIDIONE		PERCENTAGE EOSINOPHILES AFTER TRIDIONE RESUMED	
PATIENT	TOTAL NO. WEEKS OF TRIDIONE THERAPY	PERCENTAGE EOSINOPHILES	NO. WEEKS WITHOUT TRIDIONE	PERCENTAGE EOSINOPHILES	NO. WEEKS OF TRIDIONE THERAPY	PERCENTAGE EOSINOPHILES
F. D.	80	21	2	18	2	9
C. N.	36	18	4	4	2	18
J. A.	45	17	6	8	Not started again	
L. B.	78	16	2	1	Not started again	
V. F.	12	13	4	7	2	9
D. R.	36	13	2	6	4	11
N. Y.	100	13	2	1	1	4
J. C.	20	12	2	3	8	25
H. P.	5	10	1	14	4	11
Range	5-100	10-21	2-6	1-18	1-8	9-25
Average		14.8		6.9		9.7

Eosinophilia has not been confined to the group having neutropenia, although the average percentage for this group is 6.2 compared with 3.8 for the entire series. The high incidence of clinical allergy in the patients or immediate families in the whole group doubtless has some bearing on these figures and deserves further investigation.

DISCUSSION

The etiology of agranulocytosis is described by Dameshek[8] as a combination of a drug or chemical, and an allergic or sensitivity reaction toward it. Several authors have emphasized the effect of substitutions in the benzene ring,[9] presence of the benzamine nucleus, or the NH (imido) radical, whether the latter remains as NH, or whether the H is replaced by another group.[10] Opinions differ, however, concerning the relative importance of these chemical relationships. As may be seen in Fig. 6, the tridione nucleus contains a methyl group, substituted on the imido nucleus, and, in addition, a complex dione ring.

As for the influence of allergy, the patients included in this survey were questioned regarding the presence of allergic conditions personally, or among near relatives. Of 119 patients from whom reports were obtained, a personal history of major clinical allergy in the form of allergic rhinitis, asthma, eczema, or severe urticaria was obtained in 20 per cent. An additional 10 per cent complained of minor allergic conditions. such as drug rashes, mild urticaria or eczema, or gastrointestinal allergies. The immediate families of 30 per cent

TRIMETHYLOXAZOLIDINE DIONE

(TRIDIONE)

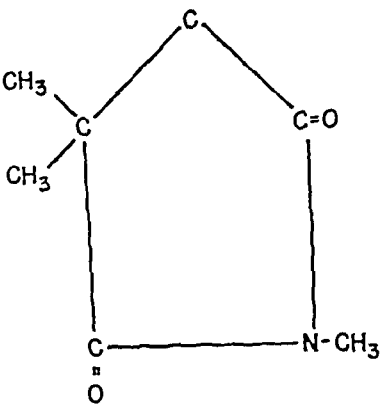


Fig. 6.—The structural formula of 3,5,5-trimethyloxazolidine-2,4-dione (tridione).

of the 119 patients had a history of major clinical allergies, and an additional 10 per cent had such a history among persons related to the patient through the preceding generation. A total of 59 per cent of these 119 patients had a positive personal or family history of allergy. The estimated incidence of allergy for the general population is about 10 per cent for frank allergies[11] and no more than 10 to 20 per cent for conditions accepted as having a truly allergic basis.[12] The incidence of allergy among our patients seems abnormally high, but we have no data, collected in a similar manner, to include both personal and family history for persons who are not epileptic. Of the patients who developed a neutropenia of 2,500 per cubic millimeter or less, and whose history of allergy was known, 62 per cent had such a personal or family history. Of the patients whose blood remained normal, 50 per cent had a positive history. This study includes such a small number of patients with neutropenia, that this incidence does not necessarily add weight to the presumed factor of allergy in the etiology of this condition. However, patients subject to seizures are possibly an unusually susceptible group. Apparently tridione has no adverse effect on the blood of animals.[13] Nonepileptic persons have not been tested. Many clinicians have argued in favor of epilepsy and migraine as allergic phenomena. Dewar[14] has reviewed the subject critically. The whole question of

any possible relationship deserves further investigation. A review of the therapeutic effects of tridione appears elsewhere.[15]

Also of interest is the absence of an immediate explosive reaction to the administration of tridione. Leucopenia in our patients developed only after weeks or months of use. The two patients, reported by others,[2, 3] who succumbed to aplastic anemia had been taking tridione for months. The blood had not been examined prior to the development of serious symptoms. This evidence of a slowly developing leucopenia allows encouragement to the use of tridione provided the blood is examined periodically. Probably, real danger does not threaten until leucopenia is followed by appreciable reduction of platelets in the blood smear.

SUMMARY

The blood of 127 patients taking tridione was examined periodically. The only significant changes were a tendency to neutropenia or eosinophilia, and a slight increase of lymphocytes. Definite neutropenia was present in 6.3 per cent of patients and borderline values in 7 per cent. In the remaining 87 per cent of patients, the number of neutrophiles remained within normal limits. Repeated examinations indicate that the neutropenia is a gradual reaction. Monthly testing would seem sufficient to prevent the development of serious neutropenia. Presumably, as with many drugs in common use, precipitate allergic reactions may occur, but we have not observed evidence of this among the patients whom we have studied.

Tridione is a potent therapeutic agent and possible effect on the blood or the bone marrow should not prevent its proper use. The following rules should be observed.

1. Tridione should be used only when specifically indicated, and under medical supervision.

2. It should not be prescribed for patients with a history of blood dyscrasia and only cautiously for those with a history of idiosyncrasy to drugs.

3. The blood should be examined monthly.

4. Patients with total neutrophile counts below 2,500, should be checked more frequently, and if the neutrophile count goes below 1,600, therapy should be withheld.

ADDENDUM

We have learned of two additional deaths, as yet unreported, of patients who developed aplastic anemia after taking tridione (with other drugs) for a number of months.

REFERENCES

1. Lennox, W. G., and Davis, J. P.: The Effect of Trimethyloxazolidine dione and of Dimethylethyloxazolidine dione on Seizures and on the Blood. The Proceedings of the Association for Research in Nervous and Mental Disease, Baltimore, Williams and Wilkins Co. (In press).
2. Harrison, T. F., Johnson, R. D., and Ayer, D.: Fatal Aplastic Anemia Following Use of Tridione and a Hydantoin, J. A. M. A. 132: 12, 1946.
3. Mackay, R. P., and Gottstein, W. K.: Aplastic Anemia and Agranulocytosis Following Tridione, J. A. M. A. 132: 13, 1946.
4. Todd, J. C., and Sanford, A. H.: Clinical Diagnosis by Laboratory Methods, ed. 10, Philadelphia, 1943, W. B. Saunders Co.

5. Wintrobe, M. M.: Clinical Hematology, 2nd ed., Philadelphia, 1946, Lea and Febiger Co.
6. Garrey, W. E., and Bryan, W. R.: Variations in White Blood Cell Counts, Physiol. Rev. 15: 597, 1935.
7. Medlar, E. M.: The Extent of Variations in the Leucocytes of Normal Individuals, Am. J. M. Sc. 177: 72, 1929.
8. Dameshek, W.: Agranulocytosis, Oxford University Press (1944).
9. Best, C. H., and Taylor, N. B.: The Physiological Basis for Medical Practice, 3rd ed., Baltimore, 1943, Williams and Wilkins Co.
10. Herz, L. F.: The Role of Amidopyrine in the Etiology of Granulocytopenia, With Special Reference to Its Chemical Structure, J. Lab. Clin. Med. 20: 33, 1934.
11. Vaughan, W. T.: Practice of Allergy, St. Louis, 1939, The C. V. Mosby Co.
12. Urbach, E., and Gottlieb, P. M.: Allergy, 2nd ed., New York, 1946., Grune and Stratton.
13. Richards, R. K., and Everett, G. M.: Tridione, A New Anticonvulsant Drug, J. Lab. Clin. Med. 31: 1330, 1946.
14. Dewar, D. C.: The Allergic Approach to Epilepsy, Practitioner, 147: 776, 1941.
15. Lennox, W. G.: Tridione in the Treatment of Epilepsy. J. A. M. A. 134: 138, 1947.

PSYCHOLOGICAL CONSIDERATIONS IN A GROUP OF CHILDREN WITH POLIOMYELITIS

EDITH MEYER, PH.D.
BOSTON, MASS.

ILLNESS can become a significant factor in the psychological development of the individual if one accepts the general notion that psychological as well as biologic development is determined by the constant interaction between the growing human organism and its environment. Illness may not only interfere with the orderly growth of the individual but also create a new medium of experiences to which the individual must adapt.

This paper will discuss certain psychological aspects of illness which in theory are becoming more widely accepted by the modern pediatrician but in practice still do not receive sufficient consideration. The psychosomatic approach stresses the intrinsic relationships of psychological and physiologic factors in human functioning. Neurologists and psychologists are aware of the disturbances in mental functioning resulting from injuries to the nervous system. The pediatrician is faced almost daily with the problems of children who, after apparent complete recovery from a serious febrile illness, still need a good deal of protection from the daily strains and who, without this precaution, are likely to present puzzling behavior problems to their parents and teachers. The pediatrician is fully aware, also, of the many psychological problems involved in the rigorous administration of any treatment plan which calls for hospitalization, immobilization, or complete bed rest for children with diseases like rheumatic fever, tuberculosis, osteomyelitis, and others. All physicians encounter, at one time or another, the psychological problems centered around the reactions of the individual to physical handicap which may be a congenital or an early acquired impairment, progressive decrease of function through illness, or sudden loss of function either through accident or illness.

A group of children with poliomyelitis provides the material for preliminary study of the various mentioned aspects. The study opens up a few avenues for future research on a variety of pediatric conditions with problems similar to those of children with poliomyelitis.

MATERIAL AND METHODS

The findings reported here result primarily from the study of a group of fifty-two patients with poliomyelitis followed from 1943 to 1946. It was started during an acute epidemic in New Haven, Conn., and continued through contacts with the children at regular intervals. The material was rounded out by observations on patients with poliomyelitis and other disorders studied in Boston. (These are being reported in other papers.)

From the Pediatric Department of Harvard Medical School and The Children's Hospital, Boston.

Aided by a grant from the National Foundation for Infantile Paralysis.

An essential part of the material which is discussed in this paper was collected at the New Haven Hospital, where the facilities of the Pediatric Department of Yale University were generously made available by Dr. Grover Powers and his staff. Their constant interest and valuable aid are gratefully acknowledged.

The children included in the main body of the study ranged from 18 months to 14 years of age, with the following distribution:

One child	18 months
5 children	2 years
7 children	3 years
5 children	4 years
6 children	5 years
5 children	6 years
6 children	7 years
3 children	8 years
8 children	9 to 12 years
6 children	12 to 14 years

These cases were, on the whole, unselected, though all children with obvious signs of retardation or any history of previous neurological disorder were excluded. They were chosen with the aim of selecting families which would be available for regular follow-up. Ten of the total were referred to the psychologist by the resident physician for attention because of questionable encephalitic involvement. Thirty-eight were chosen during the height of the epidemic while the children were still on the isolation ward. Twelve were added to the group later within the first few months of convalescence.

After the acute phase of the illness, eighteen of the children under consideration were discharged home, either as completely recovered or with minimal residual paralysis. Twenty-seven with more serious involvement were transferred to other institutions where they were to receive medical treatment for periods of time varying in length from a few weeks to years.

The various methods used to obtain psychological information were as follows: During the acute stage of the illness the children were seen regularly on the ward. No formal psychological examination was possible at this time. Informal contact, conversation, observation, and reports of the medical and nursing staff provided an initial picture of the individual child. Extensive interviews with both parents were held during the same period. They furnished information about development, personality, background, and were corroborated, wherever possible, by the information obtained by social worker and psychiatrist. At this time as well as during all the stages of the research, the close cooperation between all those who contributed to treatment or planning for the patient was considered essential for the success of the study.[1, 7]

For various reasons to be discussed later, only thirty-two were followed systematically after recovery. All of these were seen once or twice within the first year. Fifteen were seen repeatedly after this during the second and third year. Psychological examinations were given in all of these interviews and were corroborated by discussions with parents and teachers, and with social workers in the case of children in the convalescent homes. The psychological tests were the common methods used for evaluating mental ability (Gesell Developmental Schedule, Stanford-Binet, Wechsler-Bellevue, Merrill-Palmer) supplemented by a series of special tests designed to examine certain of the functions which are particularly likely to be impaired by damage to the nervous

system. Among the tests used are the various Memory-for-Design tests (Ellis, Gesell, Goldstein Stick Test), Formboard tests (Pintner-Patterson and others), Block Design Tests (Kohs, Goldstein) and various learning tests (Rey and others). Their usefulness has been discussed in medical as well as psychological literature.[6, 9, 10]

RESULTS

I. In the group of children who were *clinically fully recovered* as far as motor functions were concerned. During the first weeks after discharge from the hospital or from a short stay in one of the convalescent homes there were a great many complaints of difficult behavior.

A. In the *3- to 5-year-old group,* all of the fourteen children who were discharged as recovered were reported as having some kind of behavior problem. They were hyperactive, irritable, or disobedient, or, in some instances, too dependent or "whiney." In nine of the fourteen patients, the mothers were sure that the behavior had changed since the illness. They most frequently stated that the child had formerly been somewhat difficult "but never like this." The parents' accumulated anxieties manifested themselves in different ways, ranging from overindulgence and concern to the desire to incorporate the child as quickly as possible back into the family routine and to forget about the illness. Ten of these fourteen children were given psychological tests. They all had average intellectual abilities on the standard tests but in nine of them some jumpiness, irritability, or timidity and uneasiness were noted during the examination. Five of the children (one with frank and two with questionable encephalitic involvement) showed some difficulty in drawing, copying of forms, memory-for-design, and formboard tests. The quality of their achievement in matters involving form comprehension was below that of their achievement in other fields. In further contact with these children and their mothers, it was found that the acute difficulties disappeared gradually. Of great help here were the facilities of the so-called Curative Work Shop in New Haven, which established a special nursery school for these children. The children were given exercises, supervised play, and rest periods for a few hours of the day. This gave the children the advantage of outside experience and afforded the mothers the relief from complete care. Several of the 5-year-olds who entered school during the year after onset of the illness had some problems in reading and writing and on reexamination still presented the difficulties in form comprehension which were noted earlier.

CASE REPORTS

CASE 1.—A boy of 4 years, 10 months, was admitted to the hospital with stiffness of neck and back. Diagnosis was poliomyelitis with involvement of neck, back, arms, and intercostals. Patient was the eldest of four children with a brother of 2 years and twin sisters of 3 months. His development was normal and he was well behaved and easy to handle.

During hospital stay he was cooperative and uncomplaining while given physical examination. Later he became uncooperative and drowsy and still later was noisy and irritable.

He was discharged after a stay of three weeks without evident impairment, and was referred to orthopedic clinic for physiotherapy once a week for the next three months.

Four Weeks After Discharge.—Psychologist's notes: active, lively, highstrung little boy who talks well and has altogether average intellectual abilities. His mother finds him irritable, stubborn, and difficult. He has temper tantrums and is difficult to reason with. Mother is harassed and overworked with the care of the children and finds that the child needs more attention and patience than she can give him now.

Later.—He is living with grandmother where he is doing excellently and where he has a quiet convalescent time.

April, 1944, Seven Months Later.—Boy is doing well in curative workshop, and has quieted down considerably.

Summary.—The temporary difficulty which this child displayed after discharge from the hospital could in this case be explained by the child's still fragile emotional state after serious illness and period of hospitalization. He was unable to take his ordinary place, without concessions, in the rather lively family group.

CASE 2.—This boy of 3 years, 2 months, was admitted to the hospital with a complaint of fever, vomiting, stiff neck, and difficulty in swallowing. There was one brother of 5 years. Child's development was considered normal except for the following facts: At the age of 6 weeks he was hospitalized because mother felt that milk was giving out and wanted him taken off the breast. Baby gained steadily. At 21 months, child was a behavior problem, would not go to sleep until eleven or twelve o'clock at night, and pushed mother away when she tried to lie down beside him. He ate well. At 33 months, he had temper tantrums, threw things, and began to swear when ignored. At this time there was considerable conflict between parents over financial matters. They were referred to a psychiatrist but never followed this up. At 35 months, patient had tonsils and adenoids removed.

Behavior in the hospital was active and altogether friendly. He was discharged after three weeks on complete bed rest for two weeks. On discharge he was active but very pale.

Two Weeks After Discharge.—The mother complained about his bad temper and difficult behavior. She said that the child had changed, that he swore and threw objects.

Six Weeks After Discharge.—Psychologist's notes state the child seems intelligent and high strung, active and willful, does not follow directions too well but is essentially delightful, and full of ideas which are not always carried out but quickly abandoned. Nursery school curative workshop was advised.

Three Months Later.—He is doing well in workshop, and is considered a good member of the group, somewhat tempestuous but not difficult to handle. Mother is reported to be happier.

Summary.—It is interesting to note that in this case the mother-and-child relationship has been difficult from the very beginning. After the polio episode the mother was inclined to forget the previous problems and to blame any behavior difficulty on the illness. The convalescent child reacted violently to the mother's anxiety. The situation was relieved by pointing out to the mother that the child was essentially not changed and was able to respond satisfactorily to nursery school technique.

CASE 3.—A girl of 5 years, 9 months, was admitted with acute poliomyelitis, with some apparent encephalitic involvement. This was an only child of divorced parents. Development was normal and she was always considered bright and cheerful. She entered first grade a few days before onset of illness.

During her hospital stay she was active, friendly, and had a tendency to monopolize the attention of adults. She became irritated whenever other children received attention. She was talkative, with a quite elaborate vocabulary, and was playful and imaginative. She was discharged after three weeks as fully recovered without any paralytic involvement. Approximately four weeks after discharge she went back to school.

Six Months After Discharge.—Psychological notes: She is sociable and friendly, a child who is apparently accustomed to the affection of adults. She is rather jumpy and occasionally a little willful when encountering demands which she tries to avoid. The child appears brighter

than her I. Q. of 100 would indicate. She does well in tasks which can be solved quickly but often answers too impulsively. She has short attention spans and is quite poor in visualization. The child does badly in formboards, using empirical method rather than foresight. This adds to her many errors. When she becomes fatigued she gets overactive. Mother reports school adjustment is only fair. She gets up in class, and has difficulty in accepting school routine.

Twelve Months After Discharge.—Psychologist's notes: Child is less unstable but still very easily distractible. She continues to have difficulty in concentration and has a rather immature attitude toward outside demands. She is very dependent on adult approval. Attention spans are still short. The test results are essentially the same as those found six months earlier. She has improved in visuo-motor functions but is still poor in formboards, drawing. She is two years below her general mental level in Kohs Block Designs. Mother wonders whether child is slow. She has difficulty in arithmetic and the teacher is dissatisfied with the child's effort to pay attention in class. She has been promoted to second grade though her school achievements are not convincing. The family moved and no further contacts were available.

Summary.—Though essentially recovered, this child presented a variety of problems. She was easily fatigued and in her psychological picture showed short attention spans and some quite definite symptoms (lack of form comprehension, etc.) indicating sequelae of cortical involvement. The child's obvious tendency to be somewhat jumpy and overactive seemed accentuated by the illness.

B. The *older children* of the recovered group presented the following picture:

Five of the older children (all boys) went home and returned to school after periods ranging from one to three months. Four out of five found it hard to make up for the lost work. Though in all of these cases the teachers were said to be lenient and indulgent, the child found the work hard, got tired easily, and was unhappy in school. Three had difficulties at home, and all five were described by their mothers as being nervous and likely to cry at the least provocation. Two mothers stated that they thought their child had lost all sense of humor. Three of the children had been outstanding in sports and resented not being allowed to enter in any of these activities now. The psychological examinations of these five children four months after onset of illness showed adequate intelligence in the conventional type of test. Three of them had decided difficulty in tests requiring form comprehension, form analysis, and memory for designs; two did poorly only in memory for designs. Four out of five had difficulty in sustaining attention for prolonged periods and therefore did poorly in learning tests. Here, as in other cases in which difficulties were described, it seemed most probable that these were of recent origin. Had they been of longer standing, the child would have hardly been able to attain the level which he had reached previous to his illness and which was still evident in his stock of information and modes of thinking.

In the majority of cases, some of these difficulties of mental functioning continued for the first year and were quite evident in the psychological examination. Attention problems diminished first but comprehension of form materials still remained a source of concern for some time. Gradual improvement was noted in general, although none of the children have become particularly able in any of the mentioned functions.

CASE 4.—A boy of 11 years, 8 months, was admitted to the hospital because of nausea and stiffness of legs and was given a diagnosis of poliomyelitis. One brother 14, a sister 5 years, 6 months, and a sister of 4 months completed the family. The child's development was normal though he had been nervous, had had nightmares, and had walked and talked in his sleep. These symptoms were most prominent after arrival of his sister, but had largely disappeared. He is said to be jealous of the privileges of his older brother, and is doing well in seventh grade. He is active and alert and gets along well with everybody. He helps in a laundry and likes to do outside jobs. He is interested in sports.

During his stay in the hospital he was cooperative and friendly. He was interested in the other boys and was somewhat of a leader. He was intelligent and alert.

He was discharged after three weeks as essentially recovered. He was to have complete bed rest for two weeks and then was to be followed in the orthopedic clinic with physical therapy. This has continued for three months.

January, 1944, Three Months After Discharge.—Said to be irritable, jumpy, and was asking a great many questions about his uncle who had polio approximately twenty-four years ago and who still had "bad legs."

March, 1944, Six Months After Discharge.—In psychological interview he seemed rather tense, ambitious, and not too sure of himself. Altogether he has superior mental abilities and good consistent working habits, with a tendency to be better toward the end of a task than at the beginning. Reasoning ability is on a 14-year-old level and above; I. Q. is 120 to 125. Fails on memory-for-design tests on 11-year-old level and does relatively poorly (compared with other performances) in Kohs Block Designs and Formboard Tests. Mother reports him to be jumpy and irritable, crying easily, a thing which hardly ever occurred before illness. Resents not being allowed to enter sports or do after-school jobs.

January, 1945.—The boy has been back on full activity. He looks older than his age and works as a bootblack after school. He is doing well in the eighth grade. He wants to go to Military Academy. Psychologist's notes: Essentially the same results as noted in previous interview. Boy is still tense and rather jumpy but altogether is doing very well. Inferiority of visuo-motor functions is still present but verbal abstract abilities are excellent. The question remains as to whether these inabilities always may have been present and may have been compensated early in his mental development by his other abilities. Mother and patient are anxious to close the polio episode. No further follow-up.

Summary.—This essentially able and well-adjusted boy had shown signs of sensitivity and nervousness in his early years. He was seriously upset after his illness and worried about the outcome. He felt continuously frustrated by the precautions which were taken for his health. Psychological symptoms often seen in disorders of the nervous system were present but interpretation was questionable.

CASE 5.—A boy of 7 years, 9 months, was admitted to the hospital because of tiredness, weakness, staggering, and fever and a diagnosis of poliomyelitis was made. There was one brother of 9 years. The child's development was normal; he talked and walked at 11 months. Doing well in third grade, he was considered shy and nervous.

During his stay in the hospital, he was drowsy, uncooperative, and violently resistive to back packs. He was considered noisy and used bad language. Question of encephalitic behavior was raised by the House Staff and psychologist and psychiatrist were consulted. They found him rather apprehensive, resistant, and disturbed about the whole situation rather than mentally confused. Later he ceased to resist packs and was considered friendly when given his own way.

He was discharged after four weeks to complete bed rest at home for two weeks and then to be followed in orthopedic clinic.

Four Weeks After Discharge.—He was playing very actively the whole day long, was impertinent to mother, and had recurring abdominal pains of unknown cause.

Six Weeks After Discharge.—He went back to school. He burst into tears when confronted with work that the class had learned during his absence. He received poor marks because of his inability to complete the necessary make-up work. He was under pressure both

at school and at home due to poor marks, was distressed about his marks, and said he hated school. (Conference of social worker with teacher.)

February, 1944, Three Months After Discharge.—He was doing fair work, was pushing himself hard. Most of the arithmetic was made up. The child still had pains in his arm but mother considered him less upset generally.

April, 1944, Five Months After Discharge.—Psychologist's notes: Tense child, friendly, ambitious. In lengthy tasks he still gets fatigued easily. He has an intelligent approach to problems but exhausts himself in an effort to solve them expertly. Revised Stanford gives an I. Q. of approximately 100 with wide scatter. He has reasoning ability on 8- and 9-year-old level in problems which can be solved quickly and intuitively. Memory for facts is on a 10-year-old level. He fails on 7- and 8-year-old level when patient construction and following of directions are called for, has difficulty in learning new materials and in visuo-motor functions, and writes poorly. One senses that this child is not yet functioning to the best of his abilities. Mother finds him still difficult and easily upset. His feelings are hurt easily and he "has lost all sense of humor." He likes physical exercise but gets fatigued from climbing. He is impatient, tempestuous, jealous, and weepy.

June, 1944, Two Months Later.—Psychologist's notes: Mother reports conflict between boy and father; boy regarded as jealous of father. Patient is evidently mother's favorite.

October, 1944, Four Months Later.—A psychological interview reports improvement in learning habits and attention spans, and better endurance; he is rather poor in visuo-motor functions but improvement is noted. His I. Q. is 110. He seems more at peace with the world. He had one major incident in school—got into a fight with a boy and called the principal names. Other than this, school finds him improving and doing good fourth-grade work. Mother considers him less tempestuous and easier to live with.

April, 1945.—After a six-month interval another psychological interview reports: Considerable improvement; efficient and intelligent; better working habits; still best in immediate and intuitive learning; seems to have recuperated visuo-motor functions. The child looks happier. Mother works evenings while father is at home which "improves clothing budget of family" and "keeps peace in the house."

June, 1945.—Before going to camp he had a physical examination, and had no complaints. "Everything is fine since 1944." July, 1945, he fell off swing and broke his left arm. The child was very apprehensive. Within a month his wrist was in good condition but he missed out on going to camp. Sept. 13, 1945, he complained of stomach-aches. Sept. 21, 1945, he broke his arm again. Sept. 27, 1945, he still complained of undetermined stomach-aches. October, 1945, he had continued stomach-aches. The boy stated that these aches have bothered him for a year and a half. In November, 1945, the arm was in good condition but the family was upset. In January, 1946, the case was reopened with social service at the request of the mother.

Summary.—This boy reacts quite violently emotionally to strain and sudden discomfort. The symptoms after polio and after broken arm are quite similar in various ways. After polio the child's resistance was considerably reduced. The psychological examination revealed for a period of 12 to 18 months, irregularities of functioning consistent with nervous system involvement.

II. Children who were more *seriously disabled* and needed consistent orthopedic care over a long period of time presented the following picture:

A. The *younger children* ranged from 18 months to 3 years of age at onset of illness. They were examined from one to several times within the first six months. Five of these patients were kept flat on their backs in an institutional environment. Generally speaking, they all seemed emotionally unstable, three of them being demanding and overactive and prone to temper tantrums. Two were subdued and too unenterprising for children of their age. In the psychological examination they showed hardly any evidence of mental progress since the

onset of illness. The youngest ones had made no appreciable gains in speech development and the older ones had failed to widen their vocabularies and use of language. All were unskilled in the handling of materials, some without initiative and desire to investigate and others being abrupt and impulsive. Handling of form material seemed particularly poor. When these children were later allowed out of bed for short periods they were extremely active and restless, tried to dash from one thing to another, and seemed interested only in their newly acquired abilities to get around and to feel free in space. A serious limp seemed to accelerate their desire for activity rather than hamper it. During this period of essentially stimulus-bound behavior, the children seemed to learn very little.

In the following years, every one of these children has presented some problem in development. After discharge from the institutions, considerable progress in emotional stability was noted in three out of five children. Those who were hyperactive during the first period have continued in this pattern. Though they quieted down somewhat, they still had rather poor working habits more than two years after the onset of the illness. The children with early speech retardation gained in vocabulary, though none has reached the standards of normal speech development within the period covered by this study.

CASE 6.—A girl of 1 year, 10 months, was hospitalized with complaint of drowsiness, listlessness, and involvement of lower extremities, and was given a diagnosis of poliomyelitis. A sister of 3 years, 6 months, and a brother of 1 month completed the family. The child had normal development and spoke about ten words at the time of illness. She was independent, fed herself, and could be trusted alone in the yard playing with dolls and sandbox.

During her stay in the hospital she seemed bewildered, shy, listless and unenterprising. After three weeks she was discharged to the convalescent home for further treatment. She was unable to sit or stand. During the stay in the convalescent home she was kept in bed in a dormitory with other small children, some of whom were more active than she. She was considered unenterprising and did not resist when other children grabbed her toys. The general impression was that she was retarded.

May, 1944, Seven Months After Discharge.—Psychological notes: Child cannot come up to a sitting position but sits for short periods supported, though not often. Is considered "good as gold" by nurses, though they feel that she is retarded. Seems friendly, very quiet and passive but with "sparkle in the eyes." She enjoys test materials, is quite unskilled with them, and does not resist when they are taken away. Does not talk spontaneously but repeats what is said to her and points toward pictures about which she is being asked. Imitates very poorly. Adaptive behavior and language development approximately on a 2-year-old level (Gesell Schedule). Her chronological age is 2 years, 6 months.

October, 1944.—She was discharged home on the insistence of parents. She could not pull up to a sitting position, or walk, or stand alone. Great lack of self-confidence. Is considered timid and unenterprising.

November, 1944.—A social worker reports that the child is blossoming, although still not walking independently.

January, 1945.—Psychological note: She walks alone at home, but during hospital visit would walk only with support. The left leg is seriously involved. The child has a good vocabulary and good verbal comprehension but is slow in using speech herself. She is able to speak in sentences but does not use them conversationally, only to indicate direct wants. She is rather slow in adapting to new tasks, likes to repeat the activities she knows, and does poorly in recognition of forms, formboards, and drawing. In formal tests, however, she reaches a mental age of 3 years, 5 months, and an I. Q. of over 100. (Rev. Stanford-Binet.)

September, 1945.—Psychological examination in home: She is still rather passive and immature in attitude but is interested. She does not use much initiative but prefers tasks in which the solution presents itself. She is still not too good in visuo-motor tasks but has improved in language comprehension and use of language. The mother, who is intelligent and a good observer, considers her oversensitive and delicate emotionally.

September, 1946.—The child has gained in self-confidence and good humor though she remains sensitive and passive. She is up to age level (chronological age, 4 years, 10 months) in formal tests, though not good in answering abstract questions. She still seems immature and impractical, lacking in general interest for everyday information. She entered Sunday school but did not stay because she was bewildered and confused. Mother would like to be reassured about her mental abilities. She thinks that the child is "quite smart about a lot of things" but sometimes requires much time before she understands.

Summary.—This child's development from onset of illness has been very irregular. During the long period of hospitalization and immobilization the child has become passive and unenterprising and her speech development was retarded. She improved after returning home but continued to have some difficulties in form comprehension and other abstract functions.

CASE 7.—This boy of 3 years was admitted to the hospital with the complaint of vomiting, fever, and stiff neck of two days' duration. For a week prior to admission he had been irritable and ate poorly. There is one younger brother in the family. The patient developed normally, walked at 10 months, and talked soon after. He was never a feeding problem, was healthy, usually played vigorously, was never irritable, but was a little timid with strangers.

During his hospital stay he was quite listless and drowsy, retiring from contact. He talked very little and seemed bewildered and afraid. Later he seemed more cheerful and brighter but often was noisy and uncooperative. He was discharged to convalescent home after a 3-week hospital stay, with considerable paralysis of the right leg.

From October, 1943, until July, 1944, the child was in the convalescent home, where his behavior was described as very uncooperative, difficult to manage, sullen, and unhappy, very much in need of affection, noisy, and resistive. He was the "bad boy" of his group.

May, 1944.—Psychological note: Child is excitable, easily frustrated, but responsive to kind handling. He talks fluently, has an adequate vocabulary and quick responses but his enunciation is quite poor. His general behavior level is approximately 3 years. He is very impatient and often too unstable to follow directions adequately.

October, 1944.—He is at home, happy and robust. He is easily overexuberant, gets around at great speed with braces, seems less easily frustrated than in summer, but still does not like failure. He talks a good deal. Mother finds his speech improved since he returned home. While at the convalescent home he stuttered quite a bit and spoke indistinctly. During the examination the child becomes quite aggressive when the convalescent home is mentioned and declares, "I am not going there." General impression: good language behavior, good comprehension, but considerably better in gross motor activity than in fine motor tasks, impatient with fine motor work, draws very poorly, has visuo-motor difficulties, but is good in form-boards. Attention spans for directed work are not good but are better for games; he seems alert and happy. Since the child has been away from home so much and has had more than enough social experience, nursery school was not considered wise at the time.

September, 1945.—The patient gets around with a brace. He is very active and lively. He likes to jump and has frequently broken his brace. He seems immature in attitude, timid, and embarrassed, but more friendly as time goes on. He seems insecure about his own ability and avoids difficult tasks. His speech is almost clear. He has a good vocabulary, but is poor in responses to meaningful abstract questions. His drawing is still very poor. Mental age on Revised Stanford-Binet is 4 years, 2 months (C. A., 5 years, 0 month), and I. Q. is 80 to 85, approximately.

September, 1946.—He goes to first grade, seems steadier in attitude, is friendly and cooperative but still quite immature and easily embarrassed and still does very poorly in block-

building (imitation), drawing, Goldstein Stick Test, and number concepts. Mental age on Revised Stanford Binet is 5 years, 0 months, I. Q. is approximately 80 to 85 (C. A., 6 years, 0 months).

Summary.—This child had ben a vigorous, robust, and well-developed boy before illness. He reacted rather violently toward hospitalization and motor restrictions. He had a difficult period of social adjustment for a year after illness, improved after returning home, but showed an irregular and not altogether satisfactory development.

B. The findings on the group of *older children with serious paralytic involvement** are rather incomplete. For most of these children, the realization that their disability would be permanent came very gradually. During the acute stage of the illness they knew that they were the victims of the "dread disease" polio and many were aware of the distress of their parents. Ordinarily, however, their attitude seemed characterized by the idea that they were acutely ill, and that treatment was being given which would lead to complete recovery in due time. Being all together in one open ward, they felt they were members of a group equally afflicted. They saw new children constantly coming in and others being discharged as recovered. They started to realize what was happening to them in general only when, after a time in the convalescent home, progress seemed to slow down considerably. Many of them still remained relatively cheerful as long as they stayed together and remained members of a group. A completely new period, however, was to arise for them, when it was time to rejoin their families and to adjust back to ordinary ways of living.

Problems centered around the individual's gradual adjustment to his situation as a handicapped individual cross the borderline areas between psychology and psychiatry and clearly belong in the field of psychiatry. Therefore, they go beyond the scope of this study. Furthermore, practical considerations had their limiting effect. The staff psychiatrist of one of the convalescent homes became particularly interested in the adjustment problems of these children. Apart from his special qualifications, he had the added advantage of being able to see the children informally and almost constantly. Because of this overlapping of interests it seemed wise to abandon the psychological evaluation of nine of these children.

Psychological examinations, however, were given to a group of eleven older children at the other convalescent home. Five of these children were still on complete bed rest, whereas six others were able to get around on crutches and braces. Psychological examination of these children within the first nine months revealed normal performances in the conventional intelligence tests. Six of these children did poorly in tests involving form comprehension and analysis. Four had serious difficulty in copying of forms, memory for forms, and in formboard tests. Six had much trouble in sustaining attention in prolonged tasks. This seemed particularly distressing in several cases in which the children had been considered bright and intellectually able, and in which the poor school progress after illness added a new disappointment to the distress over the physical handicap.

*Patients with bulbar involvement and acute respiratory distress are not included in this analysis.

CASE 8.—This girl of 6 years was admitted to the hospital with weakness in right leg, fever, and pains in back and neck. She was given a diagnosis of poliomyelitis. There were two older sisters, the second of whom had a thyroid deficiency and was retarded in development. The patient's development was entirely normal and she was regarded by parents as the brightest of the family. She tried to imitate her oldest sister and seemed quite precocious to parents in certain ways. She was interested in letters, knew how to spell, and was scheduled to enter school in the fall. A high strung, lively child with occasional nightmares, she was somewhat fussy in eating habits.

During her hospital stay she was very irritable, negativistic, uncooperative, and uncommunicative with male doctors, but she established friendly relationships with all women. When no man was in sight she became talkative and humorous. She was responsive and apparently of good intelligence. She was discharged after three weeks to the convalescent home with considerable involvement of right leg.

June, 1944, Seven Months Later.—In convalescent home she gets along on crutches, is friendly and a little excitable. In psychological examination her mental level is revealed as slightly below average. She has some speech defect, enunciates poorly, has poor working habits, and short attention spans, is very poor in visuo motor functions, copies forms badly, and is poor in Kohs Block Design Tests. She has some schooling but does not know how to read and has no number concepts. She has friendly, sociable manners.

September, 1945.—The child is back home, she is in second grade but still does not read. The parents are quite bewildered since they feel that in school matters, she has forgotten what she knew two years ago. Mother states explicitly, "We always thought J was the smartest of our children. She was early in everything and now she does not seem bright."

September, 1946.—The child now walks with a limp, likes to leave crutches off, and gets around without them. She roller skates, etc. Her speech is now fluent and of better quality. She is very talkative and quick in her answers, rating a mental age of 8 years, 4 months, on Stanford Binet with an IQ of approximately 90 to 95 (C. A., 9 years, 1 month). She is still very poor in memory for designs tests and in Kohs Block Design Tests.

She is unsystematic and inconsistent in her working habits and impulsive in her reactions. She continues to have poor marks in reading and arithmetic. She is doing well in everyday matters and seems alert and responsive, though she is considered quick tempered and moody, being either irritable or exuberant.

Summary.—This child was apparently getting along well and at the age of 6 had shown interest in school matters. After her illness she displayed irregular working habits and poor visuo motor functions which, for over 2 years, interfered with her progress in reading.

CASE 9.—A boy of 7 years, 2 months, was admitted to the hospital with fever, drowsiness, and stiff neck. He seemed oriented but dopey. A diagnosis of polioencephalitis was made. Development was said to be normal, he walked at one year and talked early. He was always lively but not difficult. He was in the first grade and promoted to the second.

After a hospital stay of nearly two months he was discharged to a convalescent home with serious sternomastoid involvement.

June, 1944, Nine Months After Discharge.—Considered "retarded" in the convalescent home. Psychological notes: Very short attention spans, learning difficulties, gets fatigued and confused quite easily, reasoning ability in some short tasks seems to be essentially adequate though general mental picture still rather unsatisfactory. Very poor in visuo motor tasks, unable to read. Schoolteacher in home considers him "practically unteachable."

January, 1945.—Child is home. He is improved but still has a stiff neck and tries to support his head with his hand. Seems to get fatigued very quickly. Mother is upset and slightly impatient with his poor progress and his teacher is at the "end of her rope." The child's attention is variable and his marks range between 16 and 96. He is difficult to handle at home, cries easily, and is "like a baby." Psychological examination shows some improvement. Has rather good effort, but attention spans still short. He becomes restless easily.

Test results: Stanford-Binet gives a mental age of 7 years, 4 months (C. A., 8 years, 6 months), I.Q., approximately 80. Does poorly in Kohs Block Design Tests and in Good-enough Drawing Tests.

October, 1945.—He is in the third grade but still not reading on first grade level. His attitude seems considerably improved. His movements are quieter and he seems more stable altogether. Mother finds him easier to handle and finds that he is able to take quite some responsibility with the younger children. Psychological examination: Quality improved, better attention spans, more regular performance, still considerable visuo-motor difficulty, though improving. "Reversals" in reading are prominent. The sternomastoid involvement still is quite evident.

Summary.—This child's development after illness presented a picture often seen in children with polioencephalitis. Irritability, short attention spans, difficulty in concentration, and difficulty in the visuo-motor functions were quite prominent. His condition improved gradually, aided by careful avoidance of strain. The physical handicap was an added complicating factor in his readjustment.

DISCUSSION

In the following, the findings will be summarized and discussed briefly. Some of the results are more or less specifically related to the disease of poliomyelitis and its treatment, while others are similar to those found in any situation requiring the child's sudden separation from his customary environment under conditions of strain. Still others can be duplicated in any pediatric condition calling for institutionalization, immobilization, medical procedure, and adjustment to a more or less permanent physical handicap.

In the psychological examination, a high percentage of children clinically recovered from poliomyelitis insofar as motor disability is concerned, reveal *qualitative difficulties in mental functioning* which, as a rule, do not show in the conventional type of intelligence test but can be detected through specialized procedures. Some of the psychological symptoms are irritability, fatigability, and fleeting attention. Others are difficulties in the process of abstraction, which becomes most evident in certain visuo-motor functions. These difficulties may persist for a prolonged period. They are particularly evident in cases in which the question of encephalitic involvement was raised at the acute stage of the illness. To some degree, they are present in cases in which the medical history notes drowsiness, severe headache, and, in some instances, only nausea at the onset. In younger children, such disabilities often may hamper the formation of desirable working habits and the general adjustment to school and its demands. In older children who have already formed reading and working habits, the same disturbances may slow down the child's progress and be irritating and annoying to child and teacher. The earlier the child goes back to school the more he is likely to get into serious complications. This is particularly true when parents and teachers endeavor to have the child catch up on lost school time.

Children in a group followed in Boston were, as a rule, kept out of school for a longer period of time than those in New Haven. In most of these cases, a home teacher was able to make allowances for short attention spans and other difficulties through individual attention and shorter working periods. For this reason their learning difficulties seem to complicate their life to a less serious degree.

Sudden hospitalization, often under conditions of panic, and separation from home, are likely to create a medium for the development of emotional problems. This is particularly the case with younger children who go through the upsetting experience of being handled by strangers at a time when they are most in need of their mothers' comforting attention. Not being able to understand explanations, they do not know what is happening to them. The effects of a hospital experience are often felt for a prolonged period after discharge and may manifest themselves in a variety of symptoms such as restlessness at night, increased dependency on parents, irritability, and timidity with strangers. Similar problems have been described and are encountered daily in the experience of all those dealing with hospitalization of young children. In the case of children recovering from poliomyelitis, the emotional status of the parents is an added complicating factor which cannot be overlooked. In many instances the child discharged from the hospital returns to a mother who is barely recovering from the shock of the child's sudden illness. Completely exhausted, she is often unable to cope with the new emotional problems evolving in the care of her child. Tensions between a still convalescing child and his mother are also found in the older age groups. More rigid and prolonged medical supervision has, apart from the orthopedic value, the advantage of protecting the child from strenuous outside competition. It is more likely, however, to create new anxieties and resultant frictions between children and mothers than is the case in a more liberal regime. A good many difficulties with younger and older children center around the doctor's prescription of restricted activity, hot baths, and exercises. Depending on their own emotional make-up and on the impressiveness of the doctor, many parents feel compelled to follow these directions as accurately as possible, often more so than intended by the physician. Such meticulous adherence to doctors' orders appears in the children's eyes as either an almost intolerable new excess of parental authority or as an incomprehensible diminution of parental might. This is deeply resented by some children. In most cases of emotional difficulties resulting from hospitalization and after-treatment rather than from the child's handicap itself, psychological guidance has proved useful and has given mothers and children the opportunity to discuss and readjust their differences.

Prolonged hospitalization and immobilization do not fail to have their undesirable effects on the general development of the young children of the group under discussion. Despite expert nursing care, the babies have to forego the individualized constant affection to which their age entitles them. They have to share with others the attentions of all-too-busy nurses who usually are only able to give to every baby enough time for the necessary routine procedures but not enough for leisurely fondling. As in all institutional setups, a few of the babies become "everybody's darling" whereas others have to look on. Still other children have to live up to their once-established reputation of being "bad" and are forced to get their share of attention through such devious means. In this respect, interesting shifts of moral standards are observed among children and nurses. Since, from the orthopedic point of view, it is desirable to prevent as much motion as possible, being "good" means being quiet and unenterprising while being "bad" means indulging in the most modest imitations of a pre-

school child's normal activity. A good deal has been written in recent years about the ill effects of institutionalization and immobilization of babies on emotional and social development.[4] From the standpoint of developmental psychology a few considerations may be added here. Retardation of speech development has been noted by several observers as one of the evils of institutional living. It has been pointed out that children living in an institution do not have much opportunity to develop language as a social function since they do not have much individual contact with adults. It has also been found that children living in a children's groups get along on a rather restricted vocabulary. To the consideration of these social functions of language, one may add that the normal child, by hearing new words and by meeting new objects with new names daily, widens the scope of his language. Life for a child confined to a hospital bed lacks these possibilities. The same dearth in normal experiences becomes acute in other developmental aspects. A normal child gradually discovers space and its properties through his own activities during the first two years of his life. His sensory-motor experiences are, as pointed out by Piaget,[11, 12] Gesell,[5] and other psychologists, at the basis of his intellectual development. In a constant process of adaptation, the child's activity patterns are shaped through the interaction between the child and his environment. In simpler words, it is his ability to get around and to handle objects which brings him into contact with an ever widening world of objects. A child confined to his bed and often in a cast or on a frame, lives in a seriously restricted world.* It is interesting to observe the behavior of a good many babies who are or who have been more or less recently immobilized for prolonged periods. Their world having been confined to the restricted sphere of their immediate neighborhood, some of them remain aloof from all events and happenings taking place at any distance; others do not even try to go after an object which with some effort would be well within their reach. In this respect, as well as in others concerning the effects of hospitalization and immobilization, only follow-up studies over a period of years will determine whether or not permanent deviations of mental development will result.

SUMMARY

1. A group of fifty-two children with poliomyelitis were followed by regular interviews and psychological examinations for three years.

2. Those patients who made a complete recovery from the motor effects of the disease were likely to be emotionally fragile and often showed psychological symptoms suggesting cerebral involvement. These difficulties combined with the emotional upheaval created by the illness resulted in many problems.

3. Those patients who developed sufficient motor disability to require prolonged hospitalization and orthopedic care showed certain characteristic disturbances:

a. Those in the age-group one to five years were found to have an irregular mental development. During the first years of hospitalization, a lag in speech

*In some instances, enterprising nurses singled out an occasional child and provided him systematically with social, visual and auditory experiences. Such attempts highly applauded and encouraged by all those interested in psychological aspects, have rewarding results and prove effective in mitigating some of the problems of the immobilized child.

development was particularly noted. Difficulty in comprehension of object relationships was noted. Unsatisfactory emotional adjustment was observed, which improved gradually after the child's discharge to the home, but in most cases left some marks upon the patient's personality development.

b. Those in the age group five years and over showed varying symptoms, ranging from short attention spans, difficulty in concentration and resulting learning difficulties to more specific disturbances in functions of abstraction suggesting nervous system involvement. General emotional fragility was also quite evident. All these signs were prominent during the first year. After this, they tended to recede, though traces were still discernible for several years.

4. This study suggests that poliomyelitis, first as a specific infection of the central nervous system and second, as a crippling disease leading to prolonged hospitalization and immobilization, tends to produce interference with normal mental and emotional development.

5. On the basis of this study, it is recommended that greater attention be paid to psychological factors in the care of these children as follows:

a. Careful psychological appraisal of children recovering from poliomyelitis will be useful in order to protect the recovering child from undue mental strain.

b. Supportive technique during the period of readjustment of the child to the home may help relieve parents' anxieties and children's emotional problems in the convalescent period.

c. Special programs devised to compensate the hospitalized and immobilized child for restricted experiences will be useful in mitigating problems in emotional, mental, and social development.

REFERENCES

1. Copelman, F.: Follow-up of One Hundred Children With Poliomyelitis, The Family, Family Welfare Assoc. of America, Dec., 1944.
2. Crothers, B.: A Pediatrician in Search of Mental Hygiene, N. Y., 1937, The Commonwealth Fund.
3. Crothers, B., and Meyer, E.: The Psychologic and Psychiatric Implications of Poliomyelitis, J. PEDIAT. 28: 324, 1946.
4. Freud, A., and Burlingame: Infants Without Families, N. Y., 1944, International U. Press.
5. Gesell, A.: The First Five Years of Life, N. Y., 1940, Harper & Bros.
6. Goldstein, K., and Scheerer, M.: Abstract and Concrete Behavior, Psychol. Monogr. 53: 2, 1944.
7. Grant, A.: Medical Social Work in an Epidemic of Poliomyelitis, J. PEDIAT. 24: 691, 1944.
8. Lord, E.: Children Handicapped by Cerebral Palsy, N. Y., 1937, Commonwealth Fund.
9. Lord, E., and Wood, L.: Diagnostic Values in a Visuo-Motor Test, Am. J. Orthopsych. 12: 414, 1942.
10. Meyer, E., and Simmel, M.: Psychological Appraisal of Children With Neurological Disorders J. Abn. & Soc. Psychol. 42: No. 2, 1947.
11. Piaget, J.: La Naissance de l'Intelligence chez l'Enfant, Neuchatel and Paris, Delachaux and Niestle, 1936.
12. Piaget, J.: Principal Factors Determining Intellectual Evolution from Childhood to Adult Life, Harvard University Press, 1937.
13. Stanfield, C. E.: Personality Repercussions of Anterior Poliomyelitis. A Review of the Literature, Am. J. M. Sc. 213: 109, 1947.

INDEX TO ADVERTISERS

Please mention "The Journal of Pediatrics" when writing to our advertisers—It identifies you

Abbott Laboratories (Sulfadiazine Dulcet Tablets) ____ 4
Air-Shields Inc. (Isolette) ____ 57
Angier Chemical Company (T-Bardrin) 28
Armstrong Company, The Gordon (Baby Incubator) ____ 3
Articles to Appear in Early Issues ____ 56
Averst McKenna & Harrison Limited (Benimal) ____ 27

Beech-Nut Packing Company (Strained and Junior Foods) ____ 33
Bischoff Company, Inc Ernst (Diatussin) 39
Book Shop Bindery (Bound Journals) ____ 40
Borden's Prescription Products (Dryco) ____ Fourth Cover
Borden's Prescription Products (Mull-Soy) ____ 36
Breck, Inc., John H (Baby Breck Ointment) ____ 52
Bunny Bear (Nevawet) ____ 63
Burroughs Wellcome & Co (U S A) Inc. (Dexin) ____ 42
Burroughs Wellcome & Co (U S A) Inc. (Ryzamin B) ____ 32

Campbell Cereal Company (Malt O-Meal) 14
Campbell Soup Company (Baby Soups) 2
Care ____ 64
Carpenter Shoe Company (Self-Starters) 63
Christmas Seals ____ 64
Commercial Solvents Corporation (Kwell) ____ 24
Cutter Laboratories (Diphtheria-Pertussis-Tetanus Combined) ____ 34

Dennison (Diaper Liners) ____ 61
Doho Chemical Corporation, The (Auralgan and Otosmosan) ____ 22
Donley-Evans & Company (Gluco-Sulfonamides) ____ 11

Gerber Products Company (Strained and Junior Foods) ____ 49
Great Atlantic and Pacific Tea Company, The (White House Evaporated Milk) ____ 15
Green Shoe Mfg Co (Stride Rite) ____ 37

Heinz Company H J (Strained Peas) 10
Hoffmann-La Roche Inc (Sedulon) ____ 35
Homemakers Products Corporation (Diapene) ____ 59
Hygeia Nursing Bottle Co, Inc (Nursing Bottle Unit) ____ 65

International Pharmaceutical Corporation (Glycerite of Hydrogen Peroxide) ____ 44

Junket Brand Foods Division of Chr Hansen's Laboratory, Inc ____ 15

Kinney & Sons Inc H W (Cartose) ____ 54
Knox Gelatine (Gelatine) ____ 38

Lederle Laboratories Inc (Cerevim) ____ 29
Libbs-McNeill & Libbs Inc (Homogenized Baby Foods) ____ 12
Lilly and Company Eli (Solution Tuamine Sulfate) ____ Second Cover

M & R Dietetic Laboratories, Inc. (Similac) ____ 6
Marcelle Cosmetics, Inc. (Hypo-Allergenic Cosmetics) ____ 46
March of Dimes ____ 58
Massengill Company, The S E (Aldiazol) 30
Mead Johnson & Company (Oleum Percomorphum) ____ 72
Mead Johnson & Company (Pablum) ____ 1
Merck & Co, Inc (Pyridium) ____ 50
Merrell Company, The Wm S (Infa-Concemin) ____ 12

National Confectioners' Association The (Council on Candy) ____ 20
National Dairy Products Company, Inc. (Formulac) ____ 25
National Drug Company, The (Diphtheria-Tetanus Pertussis Combined) ____ 13

Parke, Davis & Company (Nutritive Capsules) ____ 31
Periodici Scientifici ____ 68
Pet Milk Company ____ 55
Philadelphia Serum ____ (Pertussis Immune ____) ____ 65
Professional ____ (Profexray) ____ 16

Quaker Oats Company, The (Quaker Oats ____ 19

Ralston Purina Company (Ralston) ____ 37
Ralston Purina Company (Ry-Krisp) ____ 7

Schering Corporation (Progynon-B) ____ 21
Smith Kline & French Laboratories, Inc (Eskadiazine) ____ 26
Special Milk Products Inc (Meyenberg Evaporated Goat Milk) ____ 53
Staley Mfg Co, A E (Sweetose) ____ 8
Swift & Company (Strained and Diced Meats) ____ 41

Tarbonis Company, The (Tarbonis) ____ 5

University of Minnesota Press The (Book) ____ 61
U S Savings Bonds ____ 60

Vaisey-Bristol Shoe Co, Inc. (Jumping-Jacks) ____ 47

Walker Vitamin Products, Inc (Vitamin Drops) ____ 9
Westwood Pharmacal Corp (Lowila) ____ 18
Winthrop-Stearns Inc. (Driscol) ____ 17
Winthrop Stearns Inc. (Pergon) ____ 17
Wisconsin Alumni Research Foundation (Foundation Seal) ____ 51
Wyeth Inc. (Antipertussis Serum) ____ 45

Young & Co F E (Dilators) ____ 56

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.

The reactions of both the patients and the professional personnel to the arrangement as described were almost unanimously favorable. These reactions may be defined in terms of the participants.

The Babies.—It was evident that even in this hospital which had proportionately more than the average number of nurses, the infants received more attention than would have been possible with the usual nursery arrangement. Considerably less crying and fewer periods of prolonged crying resulted. The self-demand feeding schedule advocated by the pediatrician was followed with more or less modification by most mothers. This type of feeding schedule could not be adapted to the usual nursery arrangement, but followed naturally as the result of the rooming-in arrangement, and it also contributed to the decrease in crying. There was a tendency for mothers to disturb their infants more frequently than seemed reasonable. This tendency was remedied by describing the usual sleeping behavior of infants and by the quick realization of mothers that there was considerable infantile activity which did not require their attention.

There was no apparent increase in the incidence of infections. On the contrary, the frequent examination and persistent observation of the babies by the mothers perhaps brought possible sources of infection to the attention of the pediatrician more quickly than would otherwise have been the case. This earlier recognition of communicable diseases, if substantiated, may be of especial importance.

No definite influence of the rooming-in arrangement on the number of successfully breast-fed infants could be ascertained.

The Mothers.—Mothers, especially those having their first babies, expressed almost unanimous approval and enthusiasm for the arrangement. The initial reaction of most women who had had children previously was that they wanted to rest during this "vacation" from the care of their older children. It was surprising, however, how short a "vacation" most of them really wanted. Although they did request to have their newborn babies in their rooms less than the mothers of first babies, on the whole they were also eager to "get started" with the new one.

During the early post-partum days, there was a tendency for some mothers to want their babies in the room for longer periods and to attempt to do more for them than seemed advisable to the obstetrician, but this offered no real difficulty. There may even have been an element of compulsion on the part of some mothers, as a result of the previous discussions about the arrangement,* to prove to the pediatrician (and/or to themselves) that they really did want to have the baby there.

*The type of development and the inherent characteristics of the community at Los Alamos offered a unique opportunity to put some pediatric principles into dynamic action. This was particularly related to the type of community projects which could be carried out. One of these was the prenatal conferences between the prospective parent (or parents) and the pediatrician. Ten or twelve pairs of prospective parents were invited to a series of three general discussions held during the second trimester of the wife's pregnancy. These were followed, if requested by the parents, by individual conferences during the last trimester. At one of the former of these, something of the general procedure at the time of delivery was described and the rooming-in arrangement discussed. These group conferences were usually limited to expectant parents of first children since their interests at this time were in general different from those of parents with older children. The latter were seen individually.

The rooster's legs are straight.

The boy's are not.



The rooster got plenty of vitamin D.

Fortunately, extreme cases of rickets such as the one above illustrated are comparatively rare nowadays, due to the widespread prophylactic use of vitamin D recommended by the medical profession.

One of the surest and easiest means of routinely administering vitamin D (and vitamin A) to children is MEAD'S OLEUM PERCOMORPHUM WITH OTHER FISH-LIVER OILS AND VIOSTEROL. Supplied in 10-cc. and 50-cc. bottles. Also supplied in bottles of 50 and 250 capsules. Council Accepted. All Mead Products Are Council Accepted. Mead Johnson & Company, Evansville 21, Ind., U.S.A.

responsibility of the obstetrician. Conversely, the pediatrician was almost independently responsible for the progress of the baby on breast feeding. These two obviously interrelated aspects of beginning breast feeding as well as other problems were found to be common ones in actuality, and this closer contact between mother, baby, obstetrician, and pediatrician contributed importantly to the value of the arrangement by fostering a real and joint interest in the problems of individual mothers and babies.

The Nurses.—The reactions of the nurses toward the arrangement were divided. The reasons for instituting it were discussed fully with all the participating nurses and they were for the most part accepted as reasonable. To some nurses the advantages seemed important enough to accept completely the new routine. Others were disturbed by the flexibility and "unorderliness" of the arrangement. The many requests and questions asked by mothers were time-consuming and often seemed superfluous to the nurses. It was impressed upon them, however, that these were obviously matters which concerned mothers, and merited respect as such, and should not be evaluated merely on the basis of reasonableness of the questions and requests.

In general, nurses' assignments did not appear to be materially altered by the arrangement. It is true that mothers' requests for more care for their infants than is usually given in a nursery increased nursing services during the first few days because mothers were unable to help, but this early increased expenditure of nursing time was amply compensated during the latter part of the hospital stay when most of the nursing care of the infants was taken over by the mothers.

Others.—The attitude of the fathers toward the arrangement was determined originally by their participation in the prenatal conferences, and it was favorable. During the period when the mother and baby were in the hospital after the delivery, the father's attitude usually seemed to reflect that of the mother. The chief reaction, therefore, was one of increased assurance that "everything was going well."

As would be expected, the opinions of the friends and relatives of the mothers about the wisdom of the arrangement were transmitted to the mothers. The arrangement also influenced visiting. Although the doctors did not emphasize it, mothers felt strongly that they should not have visitors while the baby was in the room. Since babies were in the rooms most of the day, by the time the mothers felt well enough to have visitors daytime visiting was practically eliminated. Handling and caring for the baby allayed the customary boredom of the second week in the hospital, and visitors were not needed for interest and stimulation. As a result, mothers probably derived more rest and relaxation than during routinely conducted post-partum periods.

SUMMARY

A rooming-in arrangement for newborns was employed for a period of two years in a twelve-bed maternity service of a small hospital at Los Alamos, N. Mex. The arrangement is described and the reactions of participants discussed.

CONTENTS FOR DECEMBER, 1947

Original Communications

Changing Medical Care in Our Changing National Life. Edwards A. Park, M.D., Baltimore, Md. ---- 599
The Adequacy of Artificial Feeding in Infancy. Stuart Shelton Stevenson, M.D., Boston, Mass. ---- 616
Observations on Insect-Borne Diseases in the South Pacific Campaign. Paul Harper, M.D., Baltimore, Md. ---- 631
Wilms' Tumor (Embryoma of the Kidney). Henry K. Silver, M.D., San Francisco, Calif. ---- 643
Oral Penicillin in Infants. George S. Husson, M.D., New York, N. Y. 651
Oral Penicillin in the Prophylaxis of Recurrent Rheumatic Fever. Martin M. Maliner, M.D., and Sol Darrell Amsterdam, M.D., Brooklyn, N. Y. ---- 658
Cerebral Abscess: A Complication of Congenital Cardiac Disease (Fallot's Tetralogy). Alfred Hand, M.D., Philadelphia, Pa. ---- 662
Peritonitis Associated With Neonatal Diarrhea. John P. Doenges, M.D., Baltimore, Md. ---- 669

Case Reports

Arachnodactylia. Thomas O. Dorrance, M.D., Bluffton, Ind. ---- 679
Congenital Hemolytic Anemia of the Newborn Infant Caused by Isoimmunization With Agglutinogen B. Abraham Nathan, M.D., Frederick C. Green, M.D., and George Weiss, M.D., New York, N. Y. ---- 683
Carbaminoylcholine (Doryl) in the Treatment of Congenital Megacolon. Jacob Greenblatt, M.D., Stamford, Conn. ---- 687
Ectromelia and Associated Development Defects. Harold E. Stadler, Indianapolis, Ind. ---- 691

Clinical Conference

Conference at Duke Hospital, Aug. 28, 1947. Clinic on Nephritis and Nephrosis ---- 696

Psychologic Aspects of Pediatrics

Glutamic Acid and Mental Functioning. Harry Bakwin, M.D., New York, N. Y. ---- 702

The Social Aspects of Medicine

Now Is the Time. Walter A. Noehren. Vancouver, Wash. ---- 704
Communication from Park J. White, M.D. ---- 709

Comments on Current Literature

Infectious Disease in Pregnancy and Fetal Maldevelopment. Russell J. Blattner, M.D., Houston, Texas ---- 710

News and Notes

News and Notes ---- 712

Book Reviews

Hospital Care in the United States. Commission on Hospital Care, 1947 ---- 713
Let's Talk About Your Baby. H. Kent Tenney, M.D., Minneapolis, Minn. ---- 713

Editor's Column

Dr. Park's Centennial Address ---- 714
Medical Care and Politics ---- 714

Index

Index ---- 715

THE BLALOCK-TAUSSIG OPERATION

GEORGE W. SALMON, M.D., AND HOWARD T. BARKLEY, M.D.
HOUSTON, TEXAS

IT IS our purpose to review our experiences with the Blalock-Taussig operation in children* as an example of the results that may be obtained in the hands of others than its originators. It is not our purpose to review the experimental work upon which the operation is based, nor to discuss the diagnostic methods and surgical techniques involved. This already has been presented by the devisors of the operation in a very authoritative manner.[1, 2] In this report we have included all children in whom the chest was explored† (see Table I), regardless of whether or not the anastomosis was performed.

DIAGNOSTIC EFFORTS

The essential procedure of this operation is the construction of an "artificial" ductus arteriosus or a communication between the systemic and pulmonary circulations. By this means, an increased amount of blood is supplied to the pulmonary circulation, providing, of course, that the pressure in the systemic circulation is higher than that in the pulmonary circulation, so that the flow of blood will be from the former to the latter. As we interpret the problem, in a cyanotic child the essential diagnostic feature becomes an effort to ascertain whether or not there is a reduction in the amount of blood supplied to the pulmonary circulation.

In the history an important diagnostic point is delay in onset of cyanosis. This delay occurred in eight of the ten patients (see Table I); and in the two exceptions an accurate history as to this point could not be obtained. This suggests that the circulatory defect became much worse with the closure of a "normal" ductus arteriosus. A significant implication, therefore, is that the construction of a new ductus arteriosus might return the patient to an acyanotic state. We do not mean to imply that cyanosis is the injurious feature. It is rather anoxemia, of which cyanosis is a manifestation, which is deleterious to the patient.

In all of the patients, physical activity before operation was greatly limited, varying only in degree. Seven of the ten gave a history of syncopal attacks; such an attack usually followed exertion and an increase in the degree of cyanosis. These attacks were no doubt due to cerebral anoxia and were further evidence of the severity of the circulatory defect.

From the Baylor University College of Medicine, the Hermann Hospital, and the Junior League Children's Clinic, Houston.

*One of these cases is from the private practice of Dr. E. B. Brandes. Others were referred to the ward service by Drs. Brandes, Betty Moody, and Charles D. Reece.

†In all of these cases the anesthesia was administered by Dr. L. F. Schumacher, Jr.

DEC 10

THE HIGH-PROTEIN INFANT FOOD



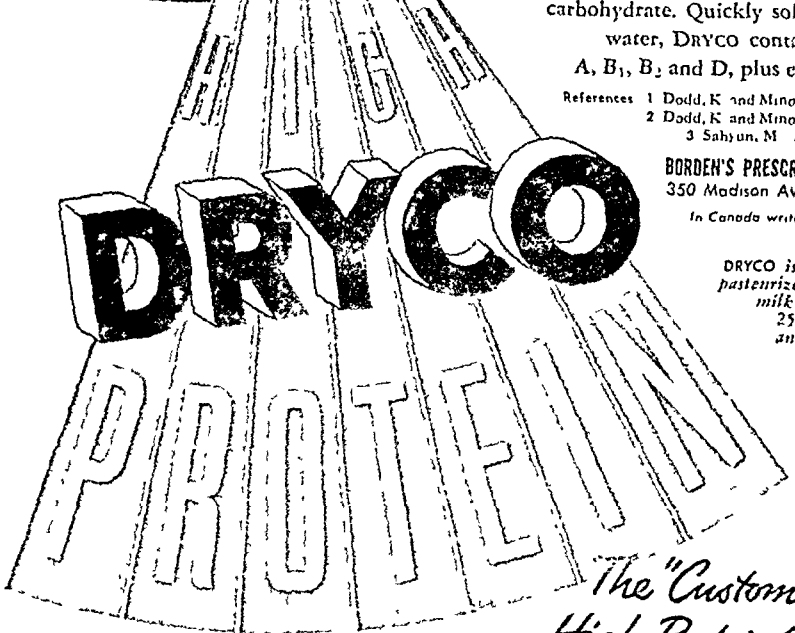
The incidence of mild protein deficiencies in children, predisposing toward infections and edema, is reported[1,2] much greater than generally realized. Infant and adolescent requirements—not only for tissue repair and maintenance, but also for growth—are much higher than in adulthood.[3] To insure adequate protein intake in infancy, DRYCO—Borden's high-protein infant food—is ideally suited as a basis for formula building. It furnishes *all the essential amino acids.* Its low fat content minimizes gastro-intestinal upsets due to fat intolerance, while its intermediate carbohydrate content lends itself for prescription with or without added carbohydrate. Quickly soluble in cold or warm water, DRYCO contains adequate vitamins A, B_1, B_2 and D, plus essential milk minerals.

References 1 Dodd, K and Minot, A S *J. Pediat.*, 8 442, 1936.
2 Dodd, K and Minot, A S *J Pediat.*, 8 452, 1936.
3 Sahyun, M *Am J. Dig Dis.*, 13·59, 1946.

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 Madison Avenue, New York 17, N. Y.

In Canada write The Borden Company, Limited Spadina Crescent, Toronto.

DRYCO is made from spray-dried, pasteurized, superior quality whole milk and skim milk. Provides 2500 U.S.P. units vitamin A and 400 U.S.P. units vitamin D per reconstituted quart. Supplies 31½ calories per tablespoon Available at all drug stores in 1 and 2½ lb. cans.



The "Custom Formula" High Protein Infant Food

CASE; AGE DATE OPERATED	ARTERIAL OXYGEN STUDIES: BEFORE OPERATION: O_2 CONTENT (VOL. %)	BEFORE OPERATION: O_2 CAPACITY (VOL. %)	BEFORE OPERATION: O_2 SATURATION (%)	BEFORE OPERATION: HB. (GM. %)	AFTER OPERATION: O_2 CONTENT (VOL. %)	AFTER OPERATION: O_2 CAPACITY (VOL. %)	AFTER OPERATION: O_2 SATURATION (%)	AFTER OPERATION: HB. (GM. %)	AGE AT ONSET OF CYANOSIS (MO.)	SIDE OF ARCH OF AORTA	SIDE OF INCISION	SYSTEMIC ARTERY USED FOR ANASTOMOSIS	REMARKS
W. S.; 8 yr. 2/13/46	16.8	25.5	65.8	19.0	20.6 (5 mo. after operation)	23.6	87.2	17.6	12	Right	Left	Left subclavian direct from aorta	Defective development of right ventricle; electrocardiogram showed left axis deviation.
E. C.; 5 yr. 3/15/46	13.2	27.8	47.4	20.7					Unknown	Left	Right		Complete pul. atresia; unable to perform anastomosis; see text; discharged unchanged.
G. D.; 11 yr. 3/27/46	19.3	26.0	74.2	19.3	17.3 (3 mo. after operation)	18.9	91.5	14.1	1	Right	Left	Left subclavian direct from aorta	
L. S.; 3 yr. 4/19/46	18.9	28.6	68.1	21.2					18	Right	Left	Left subclavian direct from aorta	Died 24 hr. after operation; autopsy showed tetralogy of Fallot plus patent "normal" ductus of small diameter; cause of death undetermined.
E. M.; 11 yr. 5/22/46	18.6	29.5	63.0	22.0	20.2 (5 mo. after operation)	22.9	88.3	17.1	2	Left	Left	Left subclavian direct from aorta	
D. C.; 6 yr. 7/12/46	15.6	28.6	54.5	21.3	16.4 (3 mo. after operation)	28.3	58.2	21.1	7	Left	Left	Left subclavian direct from aorta	Was neither helped nor apparently harmed by anastomosis.
K. B.; 7 yr. 9/24/46	16.3	31.2	52.2	23.2	18.5 (10 days after operation)	26.6	69.7	19.8	9	Right	Left	Left subclavian of left-side innominate	A patent "normal" ductus of small diameter was found at operation; nevertheless, an "artificial" ductus was created.
G. S.; 8 yr. 10/9/46	17.2	39.5	43.7	29.5	18.7 (19 days after operation)	29.8	62.8	22.2	3	Left	Left	Left subclavian direct from aorta	
J. B.; 7 yr. 11/14/46	5.5	27.7	19.8	14.8					Indefinite	Right	Left		Truncus arteriosus communis; anastomosis not performed; died twenty-seven days after operation. See text.
D. W.; 6 yr. 1/9/47	12.5	31.8	39.4	23.7	21.3 (14 days after operation)	26.2	81.3	19.5	36	Left	Left	Left subclavian direct from aorta	

did not recur. Pleural effusion sufficient to warrant aspiration occurred in two (W. S. and E. M.); however, in neither was the effusion extensive or persistent. One (G. S.) developed laryngeal obstruction of a severity to require tracheotomy. This was no doubt caused by trauma from an ill-fitting endotracheal tube used during the operation. There have been no infections.

In four of the patients (G. D., D. C., G. S., and D. W.) in whom the anastomosis was performed, the pupil of the eye of the operated side became smaller at the time of operation. There has been no evidence of other elements of a Horner's syndrome. In none of these four has this pupil resumed its normal size. The hand of the arm supplied by the cut subclavian artery in every instance became cooler than the other. During the few months immediately following operation, the temperature of the involved hand gradually rose to approach, but not completely attain, that of the other hand. In every instance in which the subclavian artery was cut, the circumference of the affected arm became and has remained smaller than the other. However, the use of this arm has been impaired but slightly, if at all. There has been no obvious correlation between the instances of pupillary change and the degree of coolness or wasting of the affected arm.

Of the ten patients in whom the chest was explored, the anastomosis was performed in eight. Six of these were remarkably improved. One (D. C.) was neither improved nor apparently harmed (his preoperative pulmonary artery pressure was 340 mm. of water). One (L. S.) died twenty-four hours after the operation. A necropsy showed tetralogy of Fallot plus a patent "normal" ductus arteriosus of small diameter. The actual cause of death, however, was not determined.

Of the ten patients the anastomosis was not performed in two. In one of these (E. C.) the findings at operation suggested complete pulmonary atresia. None of the arteries found in the hilus of the lung were large enough to accept an anastomosis with the subclavian artery. These findings bore out the preoperative diagnosis of inadequate pulmonary blood supply. The chest was closed and the child later discharged unharmed by the exploration. In the second patient (J. B.) in whom the anastomosis was not performed, it was found at operation that the pulmonary arteries and the large systemic arteries supplying the head and pectoral girdle arose from a large single trunk. Since the pulmonary arteries were apparently of adequate size, no anastomosis was performed. This patient had quite the most severe condition we have seen; her arterial oxygen saturation was only 19.8 per cent. Although she survived the exploration, she suffered widespread central nervous system damage occasioned either by widespread thromboses, or possibly anoxia, and died twenty-seven days later. Permission for an autopsy could not be obtained.

Each of the six who was improved is now enjoying activity approaching that of a normal child. None has experienced a recurrence of the syncopal attacks so common before operation. The alterations in the arterial oxygen studies are tabulated in Table I. In these six children, the average arterial oxygen saturation before operation was 56.4 per cent; after operation, 80.1 per cent. The cyanosis of the lips improved either at the time of operation

A NOTE ON EXPERIENCES WITH A ROOMING-IN ARRANGEMENT FOR NEWBORN INFANTS IN A SMALL HOSPITAL

HENRY L. BARNETT, M.D.
NEW YORK, N. Y.

THERE has been increasing interest recently in a new departure in hospital procedure which allows the newborn infant to reside in the mother's room during a greater part of the postpartum period.[1, 2, 3, 4] This stems from the increasing emphasis placed upon the newborn period as an important experience in the emotional development of both infant and mother. Interest in this so-called "rooming-in" arrangement has been stimulated also by the increasing attention of the pediatrician to the developmental problems of the well baby. The arrangement permits the pediatrician, obstetrician, and nursing staff to observe and perhaps help in solving some of the problems which, with customary arrangements, are postponed until the mother is at home, and in a certain sense, alone.

A rooming-in arrangement for newborn infants was employed in the twelve bed maternity ward of the hospital at the atomic bomb project at Los Alamos, N. Mex. No systematic observations or accurate record of the reactions to the arrangement were made. However, general observations and interest in these reactions were sustained over a period of two years, and certain definite impressions were gained. The scarcity of such studies has prompted this note on experiences with a rooming-in arrangement in a small hospital. Establishing the soundness of these impressions and the application of the arrangement to a large maternity service will require more extensive and precise observations.

The obstetric ward of the 120-bed hospital at Los Alamos was a separate wing consisting of a nursery with a preparation and formula room and six double rooms with individual baths. During the two-year period of observations, the number of deliveries averaged twelve to fifteen per month.

Infants were admitted to the nursery from the delivery room and usually remained there for the first day after birth. The actual practice of the rooming-in arrangement was flexible. The daily period the infants were in the mothers' rooms was decided entirely by the individual mothers; it varied considerably with different mothers and on different days with the same mother. The infants were always returned to the nursery during the night.

There were no separate cubicles for the babies in the mothers' rooms. Two mothers and two babies usually occupied each room. The attempt was made to group mothers with babies of approximately the same age in the same room. A bassinet with a high stand was kept beside the bed of each mother in a position where she could see and reach the baby. The sides of the bassinet were of one-half inch spaced ribs, which allowed the mother to see the baby in it.

From the New York Hospital and the Department of Pediatrics, Cornell University Medical College.

HOMOLOGOUS SERUM HEPATITIS FOLLOWING TRANSFUSION IN AN INFANT

LIEUTENANT HENRY B. BRUYN (J.G.), MEDICAL CORPS,
UNITED STATES NAVAL RESERVE (INACTIVE)*
BERKELEY, CALIF.

HOMOLOGOUS serum hepatitis has been defined,[1] as a disease, "produced by parenteral inoculation of whole blood, serum, or plasma, ordinarily obtained from an individual who is supposedly nonjaundiced, or at least a donor not known to be ill with infectious hepatitis." This condition is differentiated at present from infectious hepatitis, which, although also capable of transmission parenterally through blood or blood products, may, in addition, be transmitted through the feces and orally.

These clinical entities have become of increasing importance in recent years, especially in the experience of military medicine. Cases of epidemic hepatitis have been recorded among soldiers of almost every war since the War of 1812 with increasing frequency.[2] The recent war has brought about not only a clarification of the etiology of this disease and its relationship to "acute catarrhal jaundice," but it has also brought into prominence means of transmission of this disease other than by contact. With the extensive use of pooled plasma and whole blood, post-transfusional hepatitis has become recognized not only as a definite disease but also as a hazard.[3-11] Drying and freezing the blood product does not eliminate the agent of transmission.[5] The pooling of plasma, both commercially and in hospital blood banks, obviously increases the chances of transfusing a patient with material from a donor carrying the virus in his blood.[12] In 2,040 hospital patients transfused with pooled plasma, Spurling and Vaughn[13] found an incidence of homologous serum hepatitis of 7.3 per cent, while in 1,284 patients transfused with unpooled whole blood there were no cases. The donor who is the source of transmitted infectious hepatitis may be undetected either through failure to elicit from him a history of jaundice or through his having infectious hepatitis without either icterus or symptom.[11, 14]

It should not be implied, however, that homologous serum hepatitis is a new condition, for as early as 1885, Lurman (cited in[4]) noted an outbreak of jaundice among shipyard workers in Germany following vaccination with "glyceranated, humanized lymph." The British workers[4] have described the occurrence, in 1937, of an outbreak of jaundice in patients inoculated with a certain lot of measles convalescent serum. Since then there has been an extensive series of papers and reports, from both England and America, of jaundice following the use of yellow fever vaccines which contained human serum.[3, 4, 15, 16] It was very soon apparent that these cases of jaundice were analogous to those appearing after plasma and blood transfusion.[4-7, 11]

It has been demonstrated that this disease is due to a filterable agent, probably a virus, which is similar to, but not identical to, the virus of infectious

*Fellow in Research, Department of Medicine, University of California Medical School, San Francisco.

The usual sequence of events with the rooming-in arrangement was a request by most mothers to have their babies in the rooms shortly after the delivery; less eagerness on the second day; and on the third day a dampening of enthusiasm. The last was ascribable to a combination of circumstances: physical discomfort of painful breasts and healing episiotomy; subsidence of the feelings of elation and relief over the successful termination of the pregnancy; direct manifestations from the baby that he was not yet getting enough milk precipitating a sudden anxiety over the actual beginning responsibility for the baby; and perhaps other factors. Thereafter there was almost always a rapidly increasing desire to have the baby in the room most of the day.

After the fifth or sixth day, the mothers assumed a large share of the care of the infants. Sufficient supplies were kept in the mother's bedside cabinet so that she could change the diapers and dress the baby without calling the nurse. Babies were breast fed without assistance but, because of lack of facilities for storing or warming bottles in the rooms, it was necessary for mothers of bottle-fed infants to request the nurse to bring the feedings.

The mothers were impressed by the fact that they were learning these techniques by doing them. In place of the usual "demonstrations" they were actually first shown, then helped, and then corrected in their techniques. They appreciated that they were really learning these procedures under the best possible guidance.

The Doctors.—As observed by the pediatrician, the greatest single advantage of the arrangement was the feeling of confidence exhibited by mothers of first babies upon leaving the hospital. This confidence was in striking contrast to the trepidation of most mothers of first babies leaving a hospital with the usual nursery arrangement. Closer contact between mother and pediatrician during the newborn period, which the rooming-in arrangement demands, and actual experience of the mother with the baby undoubtedly contributed jointly to this increased confidence. There was rarely an instance during the first few days at home of "the baby cries so much and he never did in the hospital—what am I doing wrong?" These mothers had observed how much and how often their babies cried in the hospital despite the expert care of trained and experienced pediatric nurses and the close supervision of the pediatrician.

The arrangement provided an unexcelled opportunity for the pediatrician to observe the mother and baby together. From these observations and those of the nurses, the pediatrician gained insight and understanding of individual mothers and babies which aided his later interpretation of their developmental problems.

The close association between pediatrician and obstetrician* in carrying out the rooming-in arrangement clarified many problems which previously had been designated as obstetric or pediatric. As an example, before the arrangement was instituted, questions about breast feeding such as care of the breasts and the mother's general physical condition were considered almost entirely the

*Dr. James F. Nolan, St. Louis, Mo., as first head of the Los Alamos Hospital, made it possible to set up the rooming-in arrangement and, as the obstetrician, participated in it and contributed to its functioning by his understanding and cooperation.

point out that, as Havens[25] has stressed, little is known as to the length of time that the infective agent is present in the blood or feces of patients either convalescent from or in a clinical relapse of infectious hepatitis.

The pathology of homologous serum hepatitis has recently been reviewed by Wood,[26] who stresses the similarity between this disease and cases of so-called "acute yellow atrophy of unknown etiology." He states that "the burden of proof is on the pathologist to exclude the probability of virus hepatitis, when confronted by a case of so-called idiopathic acute yellow atrophy."

The close relation of homologous serum hepatitis to pediatrics is manifest in the reports of jaundice following the use of prophylactic convalescent serum for measles[27] and for mumps.[28] With the recent account by Loehle[29] of the successful use of oral plasma in newborn and premature infants, the possibility of transmission of infectious hepatitis in this way is raised. Havens[25] transmitted the agent of infectious hepatitis by feeding the serum to volunteers. Furthermore, investigators in England[30] have been able to trace outbreaks of jaundice in diabetic and venereal disease clinics to syringes or needles contaminated with the icterogenic agent, and have suggested that postarsphenamine jaundice is very often in reality homologous serum hepatitis. They have also found cases transmitted through syringes used for intravenous anesthesia as well as several other routine intravenous procedures.

While infectious hepatitis in peace time has been frequent in pediatric age groups, it thus can be seen that the serum transmitted disease must now also be considered in cases of jaundice in children. The occurrence of a fatal case of homologous serum hepatitis in an infant, following transfusions for erythroblastosis fetalis, has prompted this report, to stress that the condition is a pediatric problem as well as a military one, and also to present the pathology of the case.

CASE REPORT

This baby was born Oct. 26, 1945, at the United States Naval Hospital, Oakland, California, with a birth weight of 7 pounds, 13 ounces. The mother was a 28-year-old primipara who had had no transfusions and who had no history of miscarriage. The delivery was normal and except for the necessity of aspirating mucus from the infant's pharynx at the time of delivery, the immediate postnatal course was uncomplicated. On the day after delivery, the infant was noted to be markedly jaundiced, with enlarged liver and spleen. Blood studies at that time revealed a red blood count of 3.5 million and hemoglobin of 14 Gm. (Sahli). The smear showed 95 erythroblasts. The baby, mother, and father were all found to be Rh positive. A titration on the mother's serum by Wiener's method[36] gave no evidence of anti-Rh antibody. The conglutination test[32] was not done. A presumptive diagnosis of erythroblastosis fetalis was made on the assumption that the baby and mother were of different Rh sub-types.

A transfusion of 70 c.c. of whole, citrated, Rh-negative blood was given on October 29, and the baby was followed throughout his hospital stay with red blood counts and hemoglobin determinations. Following the transfusion, the red blood count was 4.3 million, with a hemoglobin of 16 Gm. A smear showed 18 erythroblasts. Five days after birth a smear showed no erythroblasts and none were seen on subsequent smears. The hemoglobin remained up until Nov. 14, 1945, when it was found to be 9.5 Gm. It was thought, however, that the baby would continue to improve with iron supplement, and he was discharged home on November 20 with a weight of 8 pounds, 13 ounces. On discharge, spleen and liver were not palpable.

Favorable impressions were gained of both the desirability and feasibility of the rooming-in arrangement as applied to a small hospital. These impressions stemmed chiefly from the increased confidence with which mothers of first babies left the hospital and the closer participation of pediatrician, obstetrician, and nursing staff in observing and thereby helping to solve many of the problems which, with customary nursery arrangements, are postponed until the mother is at home, and, in a certain sense, alone. In addition, the arrangement provided an unexcelled opportunity for the pediatrician to observe the conduct of the mother with her newborn baby, and this insight contributed to his understanding and interpretation of subsequent developmental problems.

REFERENCES

1. Gesell, Arnold, and Ilg, Frances L.: Infant and Child in the Culture of Today, New York, 1943, Harper and Brothers, p. 82.
2. Simsarian, F. P., and McLendon, P. A.: Further Records of the Self-Demand Schedule in Infant Feeding, J. PEDIAT. 27: 109, 1945.
3. McLendon, P. A., and Parks, J.: Nurseries Designed for Modern Maternity, Mod. Hosp. 65: 46, 1945.
4. Report of the Committee on Infancy and Early Childhood of American Society for Research in Psychosomatic Problems. Attitudes of Women Toward Pregnancy and Newborn Baby, Psychosom. Med. 7: 224, 1945.

The skin showed a few very small petechiae over the cheeks, neck, and the anterior chest. A venipuncture mark was surrounded by a small area of ecchymosis. The conjunctivae were clear and there was no discharge in the nostrils or external ear canals. The thorax showed the usual symmetry and the abdomen was of normal contour. There was no palpable lymphadenopathy. The body cavities were dry. The pleura and peritoneum were smooth and glistening membranes.

Heart: The pericardial cavity contained 25 c.c. of dark yellow fluid. The heart was normal in size and weighed 37 Gm. There were several small hemorrhages at the base of the heart in the subepicardial adipose tissue, lying along the course of the coronary artery. The valves measured as follows: tricuspid, 4.5 cm.; pulmonic, 3.0 cm.; mitral, 3.5 cm.; and aortic, 3.0 cm. The endocardium was smooth and glistening, showing no hemorrhages. The coronary arteries were normally patent. The myocardium was reddish brown in color and fairly firm in consistency, measuring 0.6 cm. in the left ventricle and 0.3 cm. in the right ventricle.

Lungs: The right lung weighed 70 Gm. and the left weighed 55 Gm. They were both of the usual color with light dependent congestion and crepitus throughout. On section, the parenchyma was pinkish tan and without edema. The trachea and bronchi were lined by congested mucous membrane and contained a small amount of mucus. The hilar lymph nodes were small.

Thymus.—The thymus weighed 20 Gm., was triangular in shape, and consisted of the usual dark tan, lobulated parenchyma, in which, however, could be seen several red hemorrhages, averaging 0.3 cm. in diameter. Scattered over the surface of the organ were other hemorrhages, giving it a "flea-bitten" appearance.

Gastrointestinal tract: No abnormalities were noted in the stomach, small intestine, or colon.

Spleen: The spleen weighed 36 Gm. and appeared slightly enlarged, although of normal shape. On section it showed many malpighian corpuscles, which averaged a little over 0.1 cm. in diameter and which were quite prominent.

Liver: The liver was of the usual size, weighing 163 Gm. Its surface was smooth and reddish brown in color, except for the gall bladder area, where there was some postmortem discoloration. Its consistency was quite flabby and on cut section it showed a mottling with very large irregular areas of red alternating with lighter brownish-yellow areas. All these areas showed a prominence of the lobular markings with a grayish-white color to the portal spaces.

Gall bladder: The gall bladder was slightly dilated and contained a very light yellow mucoid bile which was easily expressed into the duodenum. The extrahepatic bile ducts were normal in appearance.

Pancreas: The pancreas was of normal size, shape, and consistency.

Genitourinary tract: Both kidneys were of normal size. The cortices were pinkish-tan in color and the medullae were dark brown and striated. The mucous membrane of the pelves and calyces was bile stained. The bladder was normal and filled with dark yellow urine. The genitals were not remarkable save for a hydrocele around the left testicle which contained about 2 c.c. of clear yellow fluid.

The brain: The brain weighed 725 Gm. and showed the usual contour, gyri, and sulci. The ventricular system was not dilated and there was no abnormal exudate. There was no gross kernicterus.

Microscopic examination.—

Lungs: The bronchi were empty except for small amounts of mucus with scattered, desquamated, epithelial cells. Quite generally, the alveolar and septal walls were considerably thickened due to edema, and there was a moderate, loosely arranged, cellular infiltration by mononuclear phagocytes together with occasional polymorphonuclear leucocytes. There was considerable hyperemia of alveolar and septal blood vessels.

Thymus gland was essentially normal with abundant thymic tissue. There was a mild hyperemia.

The degree of cyanosis before operation varied from slight, with an increase upon exertion, to severe. Suffusion of the conjunctivae was present to a corresponding degree. The degree of clubbing of the fingers and toes also varied from slight to severe.

In eight of the patients there was a loud systolic murmur along the left sternal margin, heard best in either the second or third interspace; five of these eight had a corresponding thrill, one had a doubtful thrill, and two had no thrill. In one (E. C.) there was a soft, poorly localized, systolic murmur without an accompanying thrill. In one (G. S.) there was a systolic murmur heard best in the area between the left sternal margin and the left nipple; there was a corresponding thrill. Although we prefer that there be a systolic murmur along the left sternal margin, as described above in eight of the patients, such physical findings are not the most important part of the diagnosis. In tetralogy of Fallot, for example, the physical findings may be quite variable.[3] Of the two children (L. S. and K. B.) later found to have a patent "normal" ductus arteriosus of small diameter, neither had a continuous "machinery" murmur. Although we have employed the stethograph in some instances, we do not have a sufficient number of observations to warrant conclusions as to its value.

The results of the arterial blood analyses are tabulated in Table I. The specimens were obtained from the femoral artery; the blood was taken under oil, and heparin was added to prevent coagulation. The hemoglobin values mentioned are calculated from the oxygen capacity. The electrocardiograms showed right axis deviation in all of the patients except one (W. S.); in this exception the electrocardiogram showed left axis deviation.

Although in some of the patients the heart was slightly enlarged, in the majority it was of normal size (as measured by the cardiothoracic ratio). The location of the arch of the aorta was determined by its relation to the esophagus as demonstrated by a barium swallow (see Table I and Fig. 1). In all except one (D. W.) fluoroscopy of the chest before operation indicated absence of hilar pulsation, suggesting that the pulmonary blood flow was reduced in volume. None showed evidence of pulmonary congestion; congestion rarely occurs when the pulmonary blood flow is reduced.[4] Two of the patients with more severe conditions showed moderate pulmonary fibrosis.

In four of the patients the pulmonary conus appeared normal; in six it was not present. We have not operated upon a child having an unusually prominent pulmonary conus. In all except two (D. C. and D. W.) we have thought that the pulmonary arteries were demonstrably reduced in size; in these two exceptions we could not be sure. There was included, as a part of the estimation of the size of the pulmonary arteries, an anterior-oblique view for the pulmonary window.[4] If the pulmonary arteries are small this window may appear abnormally clear. The exact angle at which the oblique view is taken depends upon the location of the arch of the aorta. In most of the patients there has been roentgenographic evidence of enlargement of the right ventricle. In only two (E. C. and L. S.) has there been the boot-shaped configuration of the heart (see Fig. 1) considered classical of the tetralogy of Fallot.

The patient in this report showed a very short prodrome of three days during which he had vomiting and lethargy, both of which symptoms have been noted in adults. The sudden appearance of the jaundice is also typical of the adult cases reported. A very detailed questioning of the mother failed to reveal any symptoms during the period after the transfusions which could have been construed as those of latent hepatitis. There was no history of exposure to any known hepatotoxic agent.

The laboratory findings in this case illustrate many of the important features of acute virus hepatitis. The obvious findings of prothrombin deficiency were present on admission and the response to parenteral vitamin K as measured by the bleeding time was dramatic. Bollman and associates have shown[33] that the liver is of great importance in the formation of prothrombin from vitamin K, and they have also demonstrated that, in the presence of severe hepatic damage, prothrombin formation from vitamin K is severely impaired. The response in this patient was not, therefore, typical. Also, in this vein, Kinsey[34] has been able to obtain excellent response to transfusions in patients with hemorrhagic tendency secondary to infectious hepatitis by preparing blood donors in advance with oral vitamin K. The urine and Van den Bergh confirmed the assumption of an obstructive type of jaundice.

The red cell fragility test would seem worthy of special note. Finks and Blumberg[22] showed that an increased resistance of the red cell to hypotonic solutions of saline occurred in cases of infectious hepatitis. Recently, Bohr[35] and Cohen[36] have presented further evidence of this increased resistance. In the present case there was an increase as far as 0.28 per cent saline, which is compatible with the figures reported by the above authors. This feature of infectious hepatitis has received little note in the literature and its occurrence in a case of homologous serum hepatitis is of interest.

The blood indices revealed a slight but definite macrocytic hyperchromic anemia which has been found to occur in cases of infectious hepatitis by Turner and Snavely.[16] Wintrobe and Schumacker[37] have also noted this type of anemia in chronic liver disorders.

The post-mortem findings were typical both grossly and microscopically of fatal cases of either homologous serum hepatitis or infectious hepatitis.[26] The petechiae found in the lungs and thymus would be further evidence of a prothrombin deficiency secondary to the extensive hepatic necrosis. The findings of an acute interstitial pneumonitis could well represent a part of a generalized virus infection as suggested by Wood[26] in discussing a similar finding in a case of fatal epidemic hepatitis.

It would seem pertinent to point out at this time some of the measures which have been suggested for the prevention of homologous serum hepatitis. Of primary importance is the obtaining of a careful and complete history from all blood donors to detect any possible hepatitis either latent or convalescent. This, of course, as illustrated in the present report and, as stressed by Rappaport,[11] will not eliminate the "healthy" carrier or donor in the preicteric phase. The safe interval to allow between hepatitis and the donation of blood has not been

In those children in whom a fairly definite diagnosis could not be made, the chest was explored. If, at the time of exploration, a more definite diagnosis could not be made, the pressure in the pulmonary artery was measured. Of the patients in whom the pulmonary pressure was measured, the anastomosis was performed in one having a pressure higher than 300 mm. of water (D. C.; 340 mm.). This child has now been followed for seven months; he was not improved and was not apparently harmed.

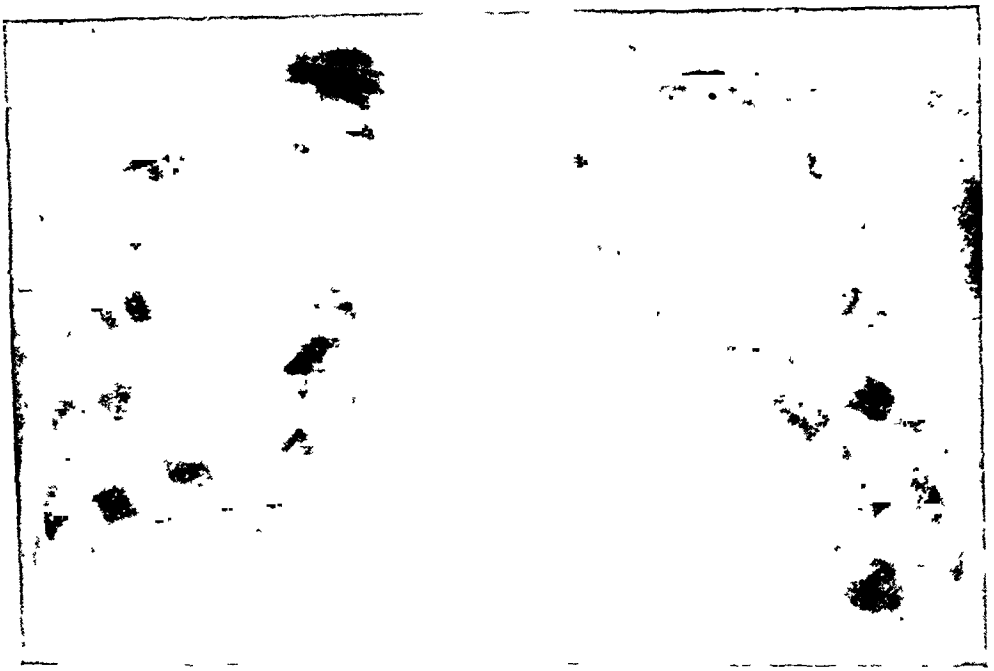


Fig. 1.—L S Chest plate with barium swallow to show right-sided arch of aorta.

One patient (G. D.) had a preoperative arterial oxygen saturation of 74.2 per cent. Ordinarily, we would not consider operating upon a child having a saturation this high. This patient had, however, been seen in one attack of heart failure and her history suggested several other such episodes. For this reason it was thought her outlook was poor and that the operation might be justified.

RESULTS

The postoperative course in most instances was surprisingly uneventful. Although we have included the administration of oxygen as a part of the routine postoperative management, in some of the patients it was discontinued within twenty-four to forty-eight hours. We have not used dicoumarol or heparin as a prophylactic measure to prevent thrombus formation. Penicillin has been administered routinely as a prophylactic measure to avoid infection.

A pneumothorax large enough to warrant intervention was noted on the second postoperative day in one patient (G. D.); after a single aspiration it

REFERENCES

1. Paul, J. R., Havens, W. P., Sabin, and A. B., Philip, C. B.: Serum Jaundice and Hepatitis, J. A. M. A. 128: 911, 1945.
2. Epidemic Hepatitis—A War Disease, Bull. U. S. Army Med. Dept. No. 70, page 4, 1943.
3. Circular Letter No. 95, Office of the Surgeon General, Outbreak of Jaundice in the Army, J. A. M. A. 120: 51, 1942.
4. Memorandum Prepared by Medical Officers of the Ministry of Health, Homologous Serum Jaundice, Lancet 1: 83, 1943.
5. Morgan, H. V., and Williamson, D. A.: Jaundice Following Administration of Human Blood Products, Brit. M. J. 1: 750, 1943.
6. Beeson, P. B.: Jaundice Occurring One to Four Months After Transfusion of Blood or Plasma, J. A. M. A. 121: 1332, 1943.
7. Steiner, R. E.: Five Cases of Jaundice Following Transfusion of Whole Blood or Human Plasma, Brit. M. J. 1: 110, 1944.
8. Grossman, E. B., Stewart, S. G., and Stokes, Jr., Post-Transfusion Hepatitis, J. A. M. A. 129: 991, 1945.
9. Snell, A. M., Wood, D. A., and Meienberg, L. J.: Infectious Hepatitis With Especial Reference to Its Occurrence in Wounded Men, Gastroenterology 5: 241, 1945.
10. Murphy, H. M.: Transmission of Infectious Hepatitis by Blood Transfusion, Gastroenterology 5: 449, 1945.
11. Rappaport, E. M.: Hepatitis After Transfusions, J. A. M. A. 128: 932, 1945.
12. Grossman, C. M., and Saward, E. W.: Homologous Serum Jaundice Following Administration of Commercial Pooled Plasma, New Eng. J. Med. 234: 181, 1946.
13. Spurling, N., and Vaughn, J.: The Incidence, Incubation Period, and Symptomatology of Homologous Serum Jaundice, Brit. M. J. 1: 409, 1946.
14. Francis, T. Jr., Frisch, A. W., and Quilligan, J. J. Jr.: Demonstration of Infectious Hepatitis Virus in Presymptomatic Period After Transfer by Transfusion, Proc. Soc. Exper. Biol. & Med. 61: 276, 1946.
15. Paul, J. R.: Hepatitis; Clinical and Epidemiological Aspects, Conference on Liver Injury, 1944, Josiah Macy, Jr., Foundation, pp. 75-77, 1944.
16. Turner, R. H., Snavely, J. R., Grossman, E. B., Buchanan, R. N., and Foster, S. O.: Some Clinical Studies of Acute Hepatitis Occurring in Soldiers After Inoculation With Yellow Fever Vaccine, With Especial Consideration of Severe Attacks, Ann. Int. Med. 20: 193, 1944.
17. Havens, W. P.: Experimental Production of Infectious Hepatitis by Feeding Icterogenic Materials, Conference on Liver Injury, 1944, Josiah Macy Jr. Foundation, pp. 77-80, 1944.
18. Lucke, B.: Epidemic Hepatitis, Proc. Inst. Med. Chicago 16: 66, 1946.
19. Neefe, J. R., Stokes, J. Jr., and Gellis, S. S., Homologous Serum Hepatitis and Infectious Hepatitis; Experimental Study of Immunity and Cross Immunity in Volunteers; A Preliminary Report, Am. J. Med. Sc. 210: 561, 1945.
20. Findlay, G. M., and Martin, N. H.: Jaundice Following Yellow Fever Immunization, Lancet 1: 678, 1943.
21. Neefe, J. R., Stokes, Jr., Reinhold, J. G., and Lukens, F. D. W.: Hepatitis Due to Injection of Homologous Blood Products in Human Volunteers, J. Clin. Investigation 23: 836, 1944.
22. Finks, R. H., Blumberg, R. W., Epidemic Hepatitis With and Without Jaundice, Arch. Int. Med. 76: 102, 1945.
23. Lietman, S. S.: Hepatic Insufficiency: Pathophysiology and Clinical Aspects, Ann. Int. Med. 25: 453, 1946.
24. Pollack, M. R.: Missed Cases of Infective Hepatitis, Brit. M. J. 2: 298, 1945.
25. Havens, W. P.: Period of Infectivity of Patients With Experimentally Induced Infectious Hepatitis, J. Exper. Med. 83: 251, 1946.
26. Wood, D. A.: Pathologic Aspects of Acute Epidemic Hepatitis With Especial Reference to Early Stages, Arch. Path. 41: 345, 1946.
27. Propert, A. S.: Hepatitis After Prophylactic Serum, Brit. M. J. 2: 677, 1938.
28. Beeson, P. B., Chesney, G., and McFarlan, A. M., Hepatitis Following Injection of Mumps Convalescent Plasma, Lancet 1: 814, 1944.
29. Loehle, J. R.: Oral Plasma Feeding, J. Pediat. 28: 145, 1946.
30. Memorandum Prepared by the Medical Officers of the Ministry of Health; Role of Syringes in the Transmission of Jaundice, Lancet 2: 116, 1945.
31. Wiener, A. S.: Hemolytic Transfusion Reactions: III Prevention, With Special Reference to the Rh and Cross Match Test, Am. J. Clin. Path. 12: 302, 1942.
32. Wiener, A. S.: Conglutination Test for Rh Sensitization, J. Lab. and Clin. Med. 30: 662, 1945.
33. Bollman, J. L., Butt, H. R., and Snell, A. M.: The Influence of the Liver on the Utilization of Vitamin K. J. A. M. A. 115: 1087, 1940.

or in the immediate postoperative period. It was not always easy to be accurate about the exact time, because all received oxygen as already mentioned. The cyanosis of the nail beds may require several days to improve as may the suffusion of the conjunctivae. In one patient (G. S.) the cyanosis was not completely cleared but it was greatly improved. In all who have been followed for at least one month, the clubbing has begun to recede.

The anastomosis was performed in eight patients. In one the murmur became continuous and in two, almost continuous. In two the murmur became definitely longer. In two the murmur changed little, if at all. One (L. S.) died twenty-four hours after operation before any change could be accurately assayed. In these few cases there was only a crude correlation of change in murmur with degree of improvement of arterial oxygen saturation. Since operation there has been a slight increase in heart size (as measured by the cardiothoracic ratio) in some instances and little change in others. In most there has been an alteration in the contour of the heart in that the region of pulmonary conus has increased in size. Follow-up electrocardiograms have shown no change in axis deviation from that seen before operation.

COMMENT

Of these ten children in whom the chest has been opened, two have not survived. Although a 20 per cent mortality may seem prohibitive for any therapeutic procedure, it is hardly so when the severity of this disease is considered. In these cases the outlook for both longevity and normal activity (except in the mildest cases) is poor. Six children have been remarkably helped. In all likelihood an appreciable number of years has been added to the life expectancy. It is undeniable that these six are now leading more active, happier, more normal lives.

SUMMARY

Of ten children in whom the chest was opened to perform the Blalock-Taussig operation, six were remarkably improved. Of the remaining four (regardless of whether or not the anastomosis was performed) two were neither improved nor apparently harmed, and two did not survive.

REFERENCES

1. Blalock, A., and Taussig, H. B.: The Surgical Treatment of Malformations of the Heart in Which There Is Pulmonary Stenosis or Pulmonary Atresia, J. A. M. A. 128: 189, 1945.
2. Blalock, A.: Physiopathology and Surgical Treatment of Congenital Cardiovascular Defects, Bull. N. Y. Acad. Med. 22: 57, 1946.
3. Sidenberg, S. S., Kessler, M. M., and Wolpaw, R.: A Case of Tetralogy of Fallot With Absence of Cerebellar Vermis: Termination by Brain Abscess, J. Pediat. 28: 719, 1946.
4. Taussig, H. B.: As quoted in (1) above.

Case Reports

STREPTOMYCIN IN THE TREATMENT OF MILIARY TUBERCULOSIS

GEORGE COBLEY, M.D., AND ELVIRA GOETTSCH, M.D.
LOS ANGELES, CALIF.

STREPTOMYCIN has been shown to be effective in arresting tuberculosis in vitro[1, 2, 3] and in vivo.[4, 5, 6] Waksman and Schatz[3] found *Mycobacterium tuberculosis* to be one of the most sensitive organisms to the bacteriostatic action of streptomycin.

Hinshaw and associates[4] at the Mayo Clinic described the response of twelve patients with generalized hematogenous tuberculosis to streptomycin. In one patient with miliary tuberculosis and no evidence of involvement of the central nervous system, pronounced improvement was noted, both clinically and roentgenographically, after two months of treatment. Six of the eleven patients with central nervous system involvement died; the other five were still living two to ten months after the clinical diagnosis had been established. McDermott[5] observed four patients with hematogenous tuberculosis who were treated with streptomycin. In five weeks all showed almost complete disappearance of roentgen evidence of miliary lesions in the lungs; in one infant, the lungs cleared completely, then meningitis developed late in the course of treatment. At the time of publication it was too early to estimate the final outcome. In infants two cases of tuberculous meningitis were favorably modified by treatment with streptomycin. In one case,[6] the spinal fluid cleared after sixty-eight days of treatment, but deafness persisted; in the other case,[7] a pleocytosis of the cerebrospinal fluid persisted without other abnormality two months after fifty-seven days of treatment.

We feel that the preliminary report of the following case should be made at the present time in order to encourage the treatment of miliary tuberculosis with streptomycin.

CASE REPORT

On Sept. 14, 1946, H. C., an 11-month-old white male infant, was admitted to the Childrens Hospital in Los Angeles with enlarged cervical lymph nodes of six months' duration and fever of two weeks' duration. He had been well and had developed normally until 5 months of age. At that time, a "chest cold" was followed by a hard swelling on the left side of the neck. Four months before admission, tumefactions appeared on the right side of the neck with persisted until hospitalization. During the interim he had had two upper respiratory infections with fever and cough, each lasting about three days. In the three months prior to entry he failed to gain weight, lost appetite, and became more and more listless. One month before admission a skin tuberculin test with 0.10 mg. old tuberculin was found to be negative. Two weeks later the child again developed fever with a wheezing cough and was admitted to another hospital. A second Mantoux test (P.P.D. 0.01 mg.) was placed which showed erythema at the end of twenty-four hours. Because a faint maculopapular rash appeared at this time, the infant was discharged home. A week later he was admitted to the Childrens Hospital.

From the Department of Pediatrics, University of Southern California School of Medicine, and the Childrens Hospital, Los Angeles.

hepatitis.[17, 18] The distinct epidemiologic and immunologic differences between the two have been summarized by Neefe and associates[19] and for the present purposes it will suffice to say that both agents are filtrable, resistant to 56° C. for thirty minutes, and transmissible to volunteers. The agent of homologous serum hepatitis is found in the serum of patients ill with the disease and throughout the incubation period. Some observers[20] have demonstrated its presence in the nasopharyngeal washings during the acute phase of the disease, although this work has not been confirmed by other workers. It has not been found in the feces, in contrast to the virus of epidemic hepatitis. There is an immunity developed following homologous serum hepatitis which does not protect against epidemic hepatitis.[19]

One of the apparent important differences between infectious hepatitis and homologous serum hepatitis is the length of the incubation period, which in the former is from fourteen to forty days from exposure to jaundice and in the serum transmitted disease has been established as being between sixty and 150 days.[15] However, mild, subclinical hepatitis without jaundice has been shown experimentally in volunteers by Neefe and associates[21] to recur throughout the fifty to seventy-five days preceding the onset of obvious hepatitis, beginning twelve to thirty-five days after inoculation. Furthermore, Francis[14] has shown that in a case of infectious hepatitis transmitted to the recipient of a transfusion from a donor in the prodromal stage of infectious hepatitis, the incubation period between inoculation and jaundice was only twenty-one days. In volunteers, the serum from this recipient induced jaundice in forty-five days. According to Neefe and associates,[21] the symptoms of the prodromal hepatitis in volunteers included malaise, anorexia, nausea, vomiting, muscular pains, and headache. Examination usually showed slight liver tenderness and occasionally a low-grade fever. These symptoms and signs usually subsided after five days and the interval to the final development of the homologous serum hepatitis was "either asymptomatic or marked by periodic recurrences of mild symptoms and signs." The occurrence of hepatitis without jaundice has also been reported in cases of the post-transfusional type of the disease by Rappaport,[11] and has been observed in cases of infectious hepatitis by Finks and Blumberg.[22] Lichtman[23] has recently stressed this phenomenon and the problems of diagnosis. He points out that a low-grade hepatitis may persist for months or even years unrecognized if jaundice is sought as a symptom. Finks and Blumberg[22] have emphasized that the detection of such cases depends on the obtaining of a history of exposure and also the typical history of the preicteric prodrome. They list anorexia, nausea, vomiting, and abdominal discomfort, especially in the right upper quadrant, as important features of this history. Liver function tests in their group of patients proved valuable in confirming the clinical impression of hepatitis in the face of a normal icteric index. Pollock[24] has shown that cases of infectious hepatitis without overt jaundice or symptom may also occur in epidemics among children. He found that Hunter's test for bilirubinuria was most useful in detecting these conditions. These features are stressed here because they represent the most important clues in the detection of a nonjaundiced but potentially dangerous donor. It is also important to

Fig 1—*A*, X-ray of chest before therapy. Note the diffuse spread of millet-sized lesions in both lung fields. *B*, One month after the completion of streptomycin therapy. The miliary lesions which had disappeared seven weeks after initiation of treatment have not recurred.

He did well at home, but two weeks later, when checked in the Outpatient Clinic, he was found to have a hemoglobin of 8.5 Gm. and the red blood count had dropped to 2.65 million. Accordingly, he was readmitted for further transfusions. At the time of admission, liver and spleen were again felt to be enlarged, but the patient otherwise appeared healthy. On December 3, 5, and 8, he was given transfusions from two different donors, a total of 220 c.c. He was discharged from the hospital Dec. 11, 1945, with a hemoglobin of 12.5 Gm. and a red blood count of 4.5 million. He was followed in the Outpatient Department in the ensuing weeks, during which time he showed a good gain in weight and a good appetite.

On Jan. 2, 1946, his hemoglobin was found to be 12 Gm. and his red blood count, 3.75 million. He weighed 12 pounds, 4 ounces. On Feb. 5, 1946, he was brought to the clinic with a complaint of vomiting for two days, with occasional temperature elevations to 102° F. His mother said he had been perfectly well before the onset of these complaints. She said that during these two days his appetite had been very poor and that he had been quite lethargic. Examination at this time was essentially negative. His liver was not noted to be either enlarged or tender. He was treated symptomatically by decreasing his carbohydrate intake and diluting the formula. He returned two days later on Feb. 7, 1946, with the complaint of jaundice, and was again admitted to the hospital.

On admission, the mother gave a history of vomiting for four days prior to admission. Three days prior to admission the mother had noticed a swelling of the left testicle without apparent tenderness. She had noticed a dark yellow color to the urine with staining of the diaper throughout the four days. On the day of admission, about eight hours before coming to the hospital, the mother noted the quite sudden appearance of very yellow color to the skin. She was impressed with the listlessness of the baby. On admission, moderately severe icterus was noted in both skin and sclerae. Over the entire body there were scattered small petechiae. The spleen was enlarged 2 fingerbreadths below the costal margin and was hard and round. The liver was enlarged also to two fingerbreadths below the costal margin. His heart showed a soft, systolic, pulmonic murmur. The left testicle showed a moderately large hydrocele which was tense. The remainder of the physical examination was within normal limits. There was no significant lymphadenopathy. The chest was clear to percussion and auscultation. It was the impression on admission that the baby had an acute hepatitis of unknown etiology. The possibility of late effects of liver damage due to erythroblastosis was considered.

Laboratory findings: red blood count, 3.4 million; hemoglobin, 14 Gm.; white blood count, 9,550, with 2 band cells, 22 segmented cells, 75 lymphocytes, and 1 basophile. There was marked toxic granulation of the polymorphonuclear leucocytes. Urinalysis was normal save for a 4 plus reaction for bile. The icteric index was 71 units. Qualitative Van den Bergh was prompt and direct. Red blood cell fragility (Sanford) was as follows: the patient showed hemolysis, beginning at .40 per cent and complete at .28 per cent; the control began at .44 per cent and was complete at .32 per cent. Kahn test was negative. Cephalin-cholesterol flocculation was 4 plus and blood indices were: packed cell volume, 30; red blood count, 2.9; hemoglobin, 10.5; volume index, 1.03; color index, 107; saturation index, 1.04; mean corpuscular volume, 103.1 cubic microns; mean corpuscular hemoglobin, 36 micromicrograms; mean corpuscular hemoglobin concentration, 35 Gm./100 c.c. packed cells.

Initial treatment consisted of vitamin C and vitamin K parenterally, as well as crude liver extract intramuscularly. On the day after admission, the patient showed a remarkable improvement. There were no new petechiae and the old ones were fading. The jaundice was also thought to be fading. Feedings were well taken and all retained. Bleeding time, which was 15 minutes on admission, was now 5 minutes. He did well throughout this day but at 5:50 A.M., on Feb. 9, 1946, breathing suddenly stopped, with no prodrome of either cyanosis or respiratory distress. The temperature course throughout the hospital stay had ranged between 97° and 100° F. (rectally).

Post-Mortem Examination.—The autopsy was performed by Drs. Melvin Black and David Wood. The body was that of a well-developed, well-nourished, male infant, measuring 67.5 cm. in length. There was no rigor mortis, but lividity of the dependent parts was noted.

SUMMARY

1 The clinical features of a case of miliary tuberculosis treated successfully with streptomycin have been described The diagnosis of tuberculosis was confirmed by biopsy of a cervical lymph gland

2. A total dosage of 91 Gm. of streptomycin was given; one gram daily in divided amounts for three months

3 Marked improvement both clinically and roentgenographically was obtained No relapse has occurred within two months after cessation of the treatment

REFERENCES

1. Feldman, W H, Hinshaw, H. C, and Mann, F. C.: Streptomycin in Experimental Tuberculosis, Am Rev Tuberc 52: 269, 1945
2 Youmans, G P, and McCarter, J. C Streptomycin in Experimental Tuberculosis Var. Hominis, Am Rev. Tuberc 52. 432, 1945
3 Waksman, S A, and Schatz, A : J Am Pharm A (Scient Ed.) 34: 273, 1945
4 Hinshaw, H C, Feldman, W. H, and Pfuetze, K H.: Treatment of Tuberculosis With Streptomycin, J A M. A 132: 778, 1946
5. Keefer, C S et al (The Committee of Chemotherapeutics and Other Agents of the National Research Council), Streptomycin in the Treatment of Infections, J A M. A. 132: 70, 1946
6. Cooke, R E, Dunphy, D L, and Blake, F G Streptomycin in Tuberculous Meningitis. A Report of Its Use in a One year old Infant, Yale J. Biol. & Med. 18: 221, 1946
7 Krafchik, L L . Tuberculous Meningitis Treated With Streptomycin, J. A. M A 132· 375, 1946

Heart: Rather extensive recent hemorrhages were present in the subepicardial adipose tissue. The myocardium was essentially normal.

Spleen: Malpighian bodies were rather large and quite prominent. No necroses were noted in the germinal centers. Moderate numbers of lymphocytes and mononuclear phagocytes diffusely infiltrated the stroma of the intervening pulp.

Pancreas was normal. Islands of Langerhans were numerous and rather prominent.

Brain: Sections of the cerebrum and cerebellum revealed no significant abnormalities. No deposition of bile pigment was noted.

Kidneys and urinary bladder were essentially normal.

Adrenal glands were essentially normal except for a moderate depletion of cortical lipoid.

Testes and epididymis showed moderate hyperemia. Otherwise, sections showed normal infantile structure. There was present no indication of orchitis.

Liver: Various sections taken from different portions of the liver showed a striking subtotal necrosis of liver cells. Those cells which remained possessed an opaque granular cytoplasm in which no nuclear outlines could be seen. Most of the necrotic material had been autolyzed. The sinusoidal architecture was intact. Infiltrating the stroma were moderate numbers of loosely distributed mononuclear phagocytes and lymphocytes. Some of the reticuloendothelial cells of Von Kupffer contained small amounts of yellow pigment.

DISCUSSION

The jaundice and anemia occurring in the first day of life in this case seemed clinically to be typical erythroblastosis fetalis, and it was thought to fall into the 10 per cent of such cases due to Rh sub-group incompatibility. It is obvious, however, that the parity of the mother throws some doubt on this assumption. Unfortunately, opportunity to investigate this matter further did not occur until after the baby's death, at which time blood specimens from the father and mother were obtained. From these it was determined* that the father was Group A Rh positive of the sub-type Rh_o Rh^I Rh^{II}, Hr positive, and that the mother was Group O Rh positive of the sub-type Rh_o Rh^I. The possible incompatibilities in the mother were against either Group A cells or cells containing $Rh.^{II}$ Significant titer of agglutinating antibody to either of these was not demonstrable at this time, which was six months post partum.

The transfusions were all with whole citrated blood obtained from three volunteer donors, all of whom had been on active duty in the Navy for at least twenty-four months and none of whom had been overseas. The blood used was all under five days old. All the equipment involved was autoclaved according to standard hospital procedure. The transfusions were given 101, 66, 64, and 61 days before the onset of symptoms. Any one of these intervals is compatible with the known incubation period of homologous serum jaundice. Following the death of the patient, the donors were questioned very carefully about any illnesses they had had in the last year. None of them had ever had jaundice, nor had any of them been exposed to a known case of infectious hepatitis. Their histories were also negative for virus pneumonia and infectious mononucleosis. None of them had had in the past year any complaints which could be ascribed to infectious hepatitis. It would seem that these three donors represent an example of the unavoidable hazard in the problem of homologous serum hepatitis, i.e., the donor in whom the history is of no support in detecting the presence of hepatitis.

*These examinations were carried out in the laboratory of Dr. L. K. Diamond, Boston, Mass.

Studies of liver function were made. There was an immediate, direct, van den Bergh reaction. The icteric index was 37.5. Cholesterol was 518. The fragility test was within normal limits. Examination of the feces showed the presence of neutral fats and fatty acids but was negative for ova and parasites. Roentgenographic examination of the abdomen showed an enlarged liver but no other abnormalities. Roentgenographic examination of the lungs showed no evidence of disease.

Five per cent glucose was given intravenously, and penicillin intraumuscularly without any appreciable improvement. Solu B was also given orally. An unsuccessful attempt was made to drain the duodenum. The child was observed over a period of about four weeks, during which time the icteric index ranged from 37.5 to 55. The temperature ranged from 98° to 103° F. The child had a variable appetite, was apathetic, and had recurrent attacks of colicky pain not localized to any point. The jaundice subsided and then became deeper again. On June 26th a surgical consultation was held, and a tentative diagnosis of a pancreatic cyst was made. At this time, there was a definite cystic mass about 4 cm. in diameter palpated at the liver margin. On July 12, 1945, roentgenologic examination of the gastrointestinal tract showed a normal stomach and duodenal bulb, with a suggestion of narrowing of the upper portion of the second part of the duodenum. This appearance was consistent with a pancreatic cyst or congenital band crossing the duodenum, but was definitely not considered obstructive. The diagnosis was duodenal abnormality, probably extrinsic.

The day after the gastrointestinal x-rays, the child had a sudden attack of pain while eating, at 5:30 P.M. On abdominal examination, a tense, round, tender mass about 4 cm. in diameter could be seen and easily palpated in the gall bladder region. This attack was typical of gall bladder colic, and was quickly relieved by hypodermic administration of atropin. At this time, the white blood count was 15,950 with a differential of 68 per cent polymorphonuclear cells, and 3 per cent immature polymorphonuclear cells. A diagnosis of cholelithiasis was made and a laparotomy advised for obstructive jaundice. On July 18, the cholesterol was 556 and the cholesterol esters 159. At operation, on July 19, the liver was found to be the seat of chronic congestive cirrhosis; the gall bladder had a thickened wall and was firmly adherent to the duodenum and the surrounding structures. After dissection in the area of the ampulla, an egg-shaped protrusion suggesting a diverticulum was found. The common duct was then identified, opened, and explored. A probe passed readily through the papilla of Vater and into the right and left hepatic and common hepatic ducts. No stones were found. The common duct was drained by means of a T tube. Because of the very serious condition of the child, it was thought advisable to do as little surgery as possible. It was thought that he would not stand the removal of the gall bladder after ascertaining where the diverticulum arose. There were numerous adhesions in this region; therefore, a cholecystostomy was done and a tube inserted into the gall bladder with double inversion of the gall bladder wall. Biopsy of the gall bladder was taken for microscopic examination. It was assumed at this time that the child's jaundice was due to either an inflammatory condition of the gall bladder or of the diverticulum, or a pressure phenomenon from the diverticulum, which lay very closely associated and adherent to the duodenum. Pressure of this diverticulum would also account for the contracture noted in the duodenum, in radiologic studies.

The pathologic diagnosis was "gall bladder tissue with marked hyperplasia of mucous membrane (papilloma)."

determined with any degree of certainty. MacCallum[38] and Oliphant[39] have showed that the icterogenic agent is not present in the blood two and one-half months after the disappearance of jaundice. Likewise, the detection of a donor in the incubation period of infectious hepatitis seems at present not always possible. It would seem best to refuse any donor who has had infectious hepatitis or jaundice of undetermined origin during the previous six months, at least, and any donor who has received whole blood, plasma, or convalescent serum during the previous six months. Also, some procedure could be developed at blood banks for observation of donors subsequent or even prior to their use. The careful recording of the source of the blood used for a transfusion would facilitate rapid tracing of such donors. Observations of the recipient for at least six months, with determination of serum bilirubin, might yield early diagnosis of homologous serum jaundice and possible expectant treatment. Rappaport[11] has shown that elevation of serum bilirubin extends over a considerable period of time preceding the actual jaundice, although the detection of bilirubinuria would seem to be a more simple routine procedure in the detection of such cases. The successful use of immune globulin prophylactically following transfusions has been reported by Grossman and associates[8] although these authors stressed the fact that failures had also been reported. They advised two injections of globulin, one month apart. This therapy is without effect when given after the onset of homologous serum hepatitis.

The pooling of plasma as a factor has already been mentioned. The use of smaller plasma pools would be much safer than the large pools used in the past and would at least decrease the total number of recipients developing homologous serum hepatitis from a single donor source.

Sodeman,[40] in a recent review, has advised that to insure the removal of the virus agent, contaminated equipment should be sterilized at dry heat, 160° C., for one hour. It would seem evident that rinsing syringes in alcohol would not accomplish this end.

Oliphant[41] has provided evidence that ultraviolet irradiation of icterogenic serum for about ten minutes may inactivate the virus. This, although MacCallum[42] has been unable to repeat these results, might eventually prove of some value.

SUMMARY

1. The clinical and pathologic findings of a fatal case of homologous serum hepatitis in an infant 15 weeks of age are reported. Transmission apparently occurred through the medium of transfusions of whole blood given 60-100 days before onset of the disease. This is believed to be the first report of such a case in this age group.

2. The literature on the subject is reviewed. It is evident that homologous serum hepatitis represents an important hazard in the use of human blood and its derivatives.

3. Means of prevention of such transmission are reviewed.

The author wishes to acknowledge the assistance of Commander David A. Wood, Medical Corps, United States Naval Reserve, and Lieutenant (j.g.) Melvin Black, Medical Corps, United States Naval Reserve.

PERIARTERITIS NODOSA IN CHILDHOOD

ELIZABETH J. BRADLEY, M.D.
SAN FRANCISCO, CALIF.

SINCE Kussmaul and Maier described periarteritis nodosa in 1866, many other cases have been reported, especially in recent years, but most of these have been in adults. In children the disease is unusual. Keith and Baggenstoss[1] state that from 1866 to 1932, a period of sixty-seven years, only twenty-three childhood cases were reported, and from 1933 to 1939, a period of only seven years, twenty-one cases. A clinical diagnosis during life was made in only seven, or 15 per cent, of these cases. Rothstein and Welt,[2] in 1933, reported that of 195 proved cases recorded up to that time, twenty-three, or 11.8 per cent, occurred during infancy and childhood, with a ratio of approximately four males to one female, and a fatality rate of 90 to 95 per cent.

CASE REPORT

D. D., a 10-year-old Filipino boy, entered the San Francisco City and County Hospital Nov. 6, 1944. Three weeks before entry he had had a severe sore throat and two weeks later complained of a sore neck, joint pains, and vomiting. Four days before entry he began to have severe abdominal pain in his right lower quadrant which was cramplike in character and became progressively worse. He had been treated by a private physician with "white pills" given every three hours. We were unable to determine whether or not these were sulfonamide tablets. He had had frequent bouts of epistaxis before the present illness, the last being a day before admission to the hospital. Two days before entry he had urinated only a few drops in twenty-four hours. For about one year he had complained of pains in the back of his legs and in the last three months had lost 8 to 10 lbs.

His past history included an entry into San Francisco City and County Hospital on Aug. 8, 1936, at the age of 21 months, for bilateral otitis media. A myringotomy was performed with uneventful recovery. His next hospital stay was at the same hospital on April 4, 1941, at the age of 6½ years for depressed skull fracture. He received sulfanilamide crystals in the wound at this time. His recovery again was uneventful. He had been seen at Stanford University Children's Clinic on four occasions for tonsillitis. His birth and development were normal. Cod liver oil and orange juice had been taken in adequate amounts. He had had measles, varicella, and pertussis, but not rheumatic fever. There was complaint of phimosis with some pain on urination for over one year.

Physical examination on entry revealed a thin boy of about the stated age complaining bitterly of abdominal pain. Temperature was 100.6° F., pulse 88, respiration 18, and blood pressure 145/115. The skin showed no lesions. There was no edema about the eyes, and the pupils reacted to light. The fundi showed no hemorrhage or exudate, and the discs were normal. The ears and throat were not red and the trachea was in the midline. There were large, tender, anterior, cervical lymph nodes and small posterior cervical nodes; the axillary, inguinal, and epitrochlear nodes could not be felt. The lungs were clear to auscultation and percussion. The heart rate was 88, the rhythm regular, and no murmurs or rub were heard. The abdomen was not distended, there were no herniae,

From the Department of Pediatrics of the Stanford University School of Medicine.
Material available through the Department of Public Health, J. C. Geiger, M.D., director.

Kinsey, R. E.: A New Aid in Control of Hemorrhage in Severe Damage to the Liver: Transfusions of Blood Fortified by Administration of Vitamin K to Donors, Arch. Int. Med. 73: 131, 1944.

Bohr, D. F.: Erythrocyte Fragility in Acute Infectious Hepatitis, J. Lab. and Clin. Med. 31: 1179, 1946.

Cohen, H.: Resistance of Erythrocytes to Hemolysis in Jaundice, Am. J. Clin. Path. 16: 49, 1946.

Wintrobe, M. M., and Schumacker, H. S.: The Occurrence of Macrocytic Anemia in Association With Disorder of the Liver Together With a Consideration of the Relation of this Anemia to Pernicious Anemia, Bull. Johns Hopkins Hosp. 53: 387, 1933.

MacCallum, F. O., and Bauer, D. J.: Homologous Serum Jaundice; Transmission Experiments With Human Volunteers, Lancet 1: 622, 1944.

Oliphant, J. W.: Jaundice Following Administration of Human Serum, Bull. New York Acad. Med. 20: 429, 1944.

Sodeman, W. A.: Infectious Hepatitis, Am. J. M. Sc. 212: 94, 1946.

Oliphant, J. W., and Holloender, A.: Homologous Serum Jaundice; Experimental Inactivation of the Etiologic Agent in Serum by Ultra Violet Irradiation, Pub. Health Rep. 61: 598, 1946.

MacCallum, F. O.: Homologous Serum Hepatitis, Proc. Roy. Soc. Med. 39: 655, 1946.

Autopsy.[c]—The kidneys were swollen and blotchily hyperemic. In the paler areas, innumerable, minute, punctate hemorrhages could be seen covering the surfaces uniformly. On the cut surface there were a few tiny foci of opaque yellowish deposits suggestive of fat. No infarcts could be found but a few of the interlobular vessels here and there were plugged with dark red or paler clots or thrombi. The lining of the pelves, ureters and bladder was edematous and contained scattered tiny hemorrhages. These were more numerous in the bladder where an occasional larger mucosal hemorrhage occurred. There was no evidence of lower urinary obstruction or infection. The lungs and other tissues were very edematous. The heart was hypertrophied and pale. There was no valvular disease except for a tiny fibrous excrescence on the posterior mitral leaflet. There were a few yellow intimal streaks in the root of the aorta. There were no coronary artery or pericardial lesions. The pancreas was normal. The spleen was large and the Malpighian bodies very prominent, but there were no infarcts. The liver was pale and swollen and the lobular markings indistinct. There were many scattered, sharply circumscribed dark patches at the capsular surface. These measured from 10 to 5 mm. or more in greatest dimension. They were often visible through the capsule as slightly sunken darker areas. Their cut surface showed tiny periportal deposits with broad dark central zones. These were apparently infarcts of the liver. The gall bladder wall was thickened, the lining was pale, pinkish and contained numerous punctate hemorrhages, but there was no ulceration. There were several small, superficial bile-stained ulcers of the jejunal mucosa but no serosal or gross vascular lesions. The mesenteric lymph nodes were large and pale. No mesenteric vascular lesions were seen.

Histological Examination.—On the adrenals there was slight to moderate patchy depletion of cortical lipoid, but in many places the cortical and medullary cells were normal. However, numerous small vessels, the type of which could not be identified, mostly located near the periphery of the cortex, showed conversion of the wall into a hyaline, strongly eosinophilic, layer which fused with similar eosinophilic material in the lumen which sometimes was completely filled with this substance. There were polymorphonuclear leucocytes and fragmented nuclei in the vessel walls, and around them there were frequently accumulated lymphoid cells, polymorphonuclear leucocytes, and large cells resembling fibroblasts. Only occasional eosinophiles were seen. The pericapsular tissue was thickened in places by cellular fibrous tissue and several larger vessels, some definitely arteries, showed changes like those within the adrenal substance.

Pathologic lesions similar to those described in the adrenal were noted in the heart, diaphragm, liver, kidney, skeletal muscle, intestine, and gall bladder.

COMMENT

This was a classical case of so-called periarteritis nodosa, which showed unusually extensive lesions. The appearance of some of the involved vessels suggested that they might be veins, although so much destruction had occurred that positive identification was impossible. No bacteria could be identified in the lesions.

The interesting features of the present case are: The onset about three weeks after an acute sore throat; the possible relation to sulfonamide therapy in a patient who had had previous treatments with the same type of drug; the fact that the correct diagnosis was suspected at entry on the basis of the clinical data, and confirmed by the characteristic urinary sediment, and without biopsy.

[c]Material on the autopsy made available by the Department of Pathology of the Stanford University School of Medicine. The macroscopic description was by Dr. William Carnes, the histological by Dr. Alvin J. Cox, Jr.

There was no family history of tuberculosis and no evidence of exposure; the mother, father, an aunt and an uncle who reside in the patient's home were found to have normal lungs on roentgen examination. The only possible exposure to tuberculosis, elicited in the history, might have occurred while the patient was visiting in Texas, where he consumed raw milk for six weeks.

On physical examination the baby was chronically ill, listless, and very pale. He was well developed, moderately well nourished, and extremely irritable when disturbed. The musculature was flabby and weakness was so pronounced he could hardly sit up. The temperature was 102.4° F. and the weight was 18 lbs., 11 oz.

The pupils reacted normally to light, the fundi were normal, and no choroid tubercles were noted. The eardrums were normal. The pharynx was acutely inflamed and the tonsils were enlarged and injected. There was visible swelling of the neck without discoloration of the overlying skin. On palpation, the cervical lymph nodes were moderately enlarged (0.5 to 2 cm. in diameter), firm, discrete, and nontender. Respiratory movements were normal in excursion. Slight percussion dullness over the right lung field posteriorly without change in breath sounds was noted; some wheezes and numerous transmitted rhonchi were heard bilaterally on auscultation, but there were no fine râles. The liver edge was palpated 2 cm. below the right costal margin; it was smooth, soft and nontender. The spleen was not felt. The inguinal, axillary and epitrochlear glands were palpable but not enlarged. The neck and spine could be flexed without resistance; the Kernig and Brudzinski tests were negative. Other reflexes were within normal limits.

The hemoglobin was 9.9 Gm. (63 per cent) with a red blood count of 3,960,000. The white blood count was 17,100 with 54 per cent polymorphonuclear leucocytes, 42 per cent lymphocytes, 3 per cent monocytes, and 1 per cent eosinophiles. The sedimentation rate was 27 mm. per hour (Westergren) and the blood Kahn was negative. The cerebrospinal fluid contained no cells, 5 mg. per cent protein, 74 mg. per cent sugar, and 668 mg. per cent chloride. Smears made from the cerebrospinal fluid showed no acid-fast or other bacterial organisms, and the culture was sterile. A smear from the throat was negative for diphtheria bacilli; the nasopharyngeal culture yielded Group A hemolytic streptococci, hemolytic *Staphylococcus aureus*, and several nonpathogens. The urine was negative. The skin tuberculin test to 0.01 mg. of old tuberculin was negative, but when an increased dose of 0.1 mg. was applied, an area of erythema and induration 1 cm. in diameter developed. A roentgenogram of the chest showed a diffuse hematogenous spread of millet-sized lesions in both lung fields, which was interpreted to be consistent with miliary tuberculosis.

A biopsy of a cervical lymph node was done to provide proof of the diagnosis of tuberculosis. A smear of the excised gland showed characteristic acid-fast bacilli; microscopic examination showed caseous material with whorls of epithelioid cells and interlacing bundles of young fibrous tissue. An occasional Langhan's type of giant cell was noted within the whorls of epithelioid cells. The normal lymph node structure was completely destroyed. A diagnosis of tuberculosis of a cervical lymph node was made.

Streptomycin was started on the fifth hospital day; a dose of 0.125 Gm. was given intramuscularly every three hours (one gram a day) for the next three months. A high caloric, vitamin-enriched diet was offered and several transfusions were given to combat the moderate anemia.

During the first five days in the hospital, the fever fluctuated around 102° F.; thereafter, the temperature remained normal throughout the course of hospitalization, except for several transient elevations associated with mild upper respiratory infections. The fact that the temperature became normal

Medical Care

THE TREATMENT OF ACUTE POLIOMYELITIS TOGETHER WITH SOME SUGGESTIONS ON DIAGNOSIS

PHILIP M. STIMSON, M.D.*
NEW YORK, N. Y.

WHEN confronted with acute poliomyelitis, especially if the patient is seriously ill, many doctors are very much at a loss to know how best to care for the afflicted child. The purpose of this paper is to clarify and enumerate, in their order, steps that might be taken.

The first thing to be done is to comfort and reassure the patient and his family and to seek to obtain their cooperation and confidence. A panicky person is naturally tense, and increased muscle tension being an important factor in practically every case of the acute disease, many patients aggravate their symptoms by their nervousness. This is particularly true of patients with the more serious manifestations, those of bulbar and respiratory difficulty. It is highly important that, from the beginning, the patient be helped to be as composed and relaxed as possible.

The next step is to determine the indications for immediate treatment, and, in particular, to determine if there are evidences that the patient's life may be at stake. The great majority of early deaths in poliomyelitis are due to failure of either the cardiac or the respiratory centers in the medulla or bulb. The bulb also contains the nuclei of the ninth, tenth, eleventh, and twelfth cranial nerves. Hence, when there is evidence of involvement of one or more of these nerves, one must be prepared for weakness or even failure of one or both of the two vital centers. A failing cardiac center is revealed by a rapid, thready irregular pulse and a falling blood pressure. When the respiratory center is failing, the patient's breathing is apt to be irregular and shallow, but if there is no other cause for breathing difficulty, he can, on demand, take a deep breath.

Because the functions of the ninth to twelfth nerves overlap to a considerable extent, it is customary to determine not which nerve is involved but what so-called bulbar manifestations are present. These include such evidences of weakness of the soft palate as regurgitation of fluids through the nose, loss of the gag reflex, and blurring of the speech. The tongue may show weakness by deviating to one side or the other. Because of weakness of the lateral pharyngeal muscles there may be difficulty or inability to swallow. Inability to cough is commonly also present in bulbar cases because of an inability to close the glottis. The combined lack of coughing and swallowing allows mucus and saliva to accumulate in the pharynx and act as a mechanical barrier to the passage of air to the lungs. Unless this fluid is continuously removed, the patient "drowns" in his own secretions.

*Associate Professor of Clinical Pediatrics, Cornell University Medical College.
From the Poliomyelitis Division of the Knickerbocker Hospital.

within twenty-four hours after streptomycin was instituted is probably a coincidence. Four days after streptomycin was started the lungs were clear to percussion and auscultation. The biopsy wound healed quickly and the swelling of the lymph nodes receded at an amazing rate. One month after treatment with streptomycin was initiated, the weight had fallen to 17 lbs., 10 oz., a loss of one pound. The erythrocyte sedimentation rate was maintained at essentially 33 mm. in one hour (Westergren). Serial roentgenograms of the lungs showed practically no change.

Five weeks after treatment was started the cervical lymph nodes had regressed until they were barely palpable. During the second month of treatment the patient gained 20 oz. of weight; the erythrocyte sedimentation rate rose to 57 mm. per hour (Westergren), which was attributed to the inflammatory reaction at the sites of injection of streptomycin. Isolation during the first six weeks of hospitalization was obligatory, and it was felt that the unavoidable lack of attention and the loneliness were presumably responsible for anorexia and a failure to gain weight. Serial roentgenograms of the lungs were taken weekly and it was not until the seventh week after therapy was started that marked improvement was noted.

During the third month of treatment the sedimentation rate remained elevated but roentgenographic improvement of the lungs continued. Toward the last it became exceedingly difficult to find sites for the injection of the streptomycin, as the most favorable muscular areas were indurated and inflamed. After three months of treatment it was necessary to discontinue the drug because of this factor.

For one month after cessation of the drug the patient remained afebrile and began to gain weight. The sedimentation rate fell to 13 mm. per hour (Westergren) and remained at this level for the last three weeks of hospitalization. At the time of discharge on Jan. 22, 1947, the weight was 19 lbs., 1 oz. The blood count, urinalysis, and cerebrospinal fluid were all within normal limits. As shown in Fig. 1 the miliary lesions in the lung fields, which had disappeared seven weeks after initiation of treatment, had not recurred at the time of discharge from the hospital.

COMMENT

Clinical evidence has shown that streptomycin has a palliative effect in patients with miliary tuberculosis. No complete eradication has yet been reported. It is too early to determine the final result in our patient, since a longer period of observation will be necessary.

The minimum dosage and the length of adequate treatment must still be accurately determined. Early diagnosis is helpful and persistent treatment with maximal doses should be maintained in cases of miliary tuberculosis, at least for three months. Intrathecal treatment has been recommended in cases in which the central nervous system is involved.

Toxic manifestations have been reported in the majority of patients receiving prolonged treatment with streptomycin. In our case the only definite untoward effect was the local reaction at the sites of injection. No evidence of disturbance of equilibrium or hearing could be detected by clinical observation. A Kobrak caloric test revealed no response to horizontal and vertical canal stimulation in either ear. Although the evidence of possible damage to the vestibular end organs seems conclusive at the present time, final interpretation should be reserved until more extensive studies with the test in this age group have been done.

stomach. If the attempt makes the patient gag, and vomiting is threatened, it should be stopped at once, because vomiting is a very dangerous complication for patients who can neither cough nor swallow. But if the tube can be passed successfully, fluid nourishment can be introduced directly into the stomach by means of the tube and the patient should be fed such preparations as egg milk shakes fortified with vitamins and amino acids. The tube can be left in place a number of hours but may be withdrawn at night so that the patient may sleep more comfortably. Poliomyelitis patients have been thus tube-fed for two weeks or more, but usually the ability to swallow begins to return in about a week. When the patient can swallow his own saliva, sips of water may be tried, followed by sweetened fruit juices and later by more substantial but easily swallowed nourishment such as broths, gelatins, applesauce, and possibly Junket. Milk, as such, should be given sparingly, if at all, the first few days of swallowing. It sticks with the mucus in the pharynx and also is readily vomited.

With or without evidences of bulbar involvement, there may be difficulties of breathing because of either weakness or tightness of the muscles used in breathing, or both. While there are many primary and secondary muscles used in the act of respiration, the essential ones are the intercostals and the diaphragm. Because of the proximity of the nuclei of their nerves of innervation in the cervical cord, there is a close relationship between weakness of the deltoids and of the diaphragm; in fact, when both deltoids are paralyzed, there is almost always marked weakness of the diaphragm. Hence, if both deltoids fail, a very careful watch should be kept of the diaphragm. In normal breathing, the diaphragm descends with inspiration and the anterior abdominal wall bulges out. But when the diaphragm is paralyzed, which may be the case on only one or on both sides, it rises into the thorax on inspiration. Observation with a fluoroscope may be necessary to detect this reversed motion, but sometimes it can be determined by careful inspection.

The clinical picture is further complicated by the fact that when the intercostals and the diaphragm are weak, they are also usually tight, this tension in itself adding materially to the dyspnea or difficulty of breathing. When the diaphragm is tense, expiration is difficult; when the intercostals are tight, inspiration is difficult; and when both are involved, the chest seems almost immobile. Furthermore, tightness lower down in the body, involving the muscles of the anterior abdominal wall, may so pin down the thoracic cage as to interfere greatly with the act of breathing.

Thus many factors may singly or together contribute to respiratory difficulty in poliomyelitis, and treatment will depend on which factors are the predominating cause in any particular case. The respiratory center in the medulla may be failing; mucus may be obstructing the passage of air to the lungs; the tiny abductors of the vocal cords may be weak, allowing the cords to come together and close the glottis; the intercostals and the diaphragm may be weak; they or other muscles may be too tight; and, finally, the patient may be too panicky to try to breathe.

Certain principles control the choice of treatment procedures. Bulbar patients almost always do badly in respirators. Oxygen must have a reasonably

CHOLECYSTITIS AND CHOLELITHIASIS IN A CONGENITAL DIVERTICULUM OF THE GALL BLADDER IN A THREE-YEAR-OLD BOY

FRANCES H. BOGATKO, M.D., AND JULIA MEHLMAN, M.D.
NEW YORK, N. Y.

DUPLICATION of the gall bladder is a rare anomaly and is reported by Boyden,[1] Bryan,[2] and other investigators as occurring once in 3,000 to 4,000 cases. On embryologic and anatomic grounds, double gall bladder is classified as follows: (1) ductular, with two cavities and two cystic ducts; (2) bilobular, with two cavities and one cystic duct; (3) diverticular, with one large cavity communicating with one or more small cavities; and (4) trabecular. The anomaly is first discovered at operation or autopsy. Golob and Kantor[3] point out that if cholecystography is performed, it must be remembered that since a diseased gall bladder may coexist with a normal accessory gall bladder, the former may not be visualized while the latter would reveal a normal sequence; this finding might easily lead to a wrong negative diagnosis with the result that an unsuspected active lesion might be overlooked.

CASE REPORT

On May 29, 1945, D. W., a 3-year-old boy, was admitted to the New York Infirmary with a history of jaundice and anorexia for seven weeks previous to admission. Two months before admission (March, 1945), this patient had an upper respiratory infection associated with severe abdominal pain around the umbilicus, vomiting, and low-grade fever. He had been seen at this time by two physicians who excluded appendicitis and made a diagnosis of intestinal influenza. Three grams of sulfadiazine were given over a period of two days. One week after the onset of illness, jaundice developed gradually. At this time there was no nausea, vomiting, diarrhea, or itching of skin, but the occasional slight rise in temperature continued. Before admission to the hospital, the mother observed that the stools were becoming clay colored. There was no history of improper diet, gastritis, or food poisoning in the family or neighborhood.

The family history was irrelevant. The child had had jaundice at 1 year of age for three weeks during dentition. On admission, physical examination showed an undernourished, chronically ill child, with markedly icteric skin and sclerae. Abdominal examination revealed an enlarged, smooth, tender liver which extended 4 fingerbreadths below the right costal margin. The spleen was palpable below the left costal margin. Otherwise, the abdominal examination was reported negative. On admission, the temperature was 100.2° F. pulse 130, and respirations 52.

The urine showed a trace of albumin, a few hyaline casts, and the presence of bile. Other laboratory tests were as follows: hemoglobin, 70 per cent; adult polymorphonuclear cells, 47 per cent; red blood cells, 3,500,000; immature polymorphonuclear cells, 2 per cent; white blood cells, 12,200; lymphocytes, 32 per cent; eosinophiles, 19 per cent. The blood type was Group A: The Rh factor was negative. The blood Wassermann was negative. Blood serum was negative for *Bacillus abortus* and *Bacillus typhosa*. The sedimentation test showed a sedimentation index of 0.6. A tentative diagnosis of toxic or infectious jaundice or acute hepatitis was made.

The progressive clinical stages of anoxia must be understood. At first there is restlessness, a beginning of anxiety, and possibly some difficulty in sleeping. Then the respiratory rate, excursion, and effort become increased. The patient becomes disinclined to talk, and when asked to count says fewer and fewer numbers in each breath. Cyanosis appears. He stops answering questions and a curious twitching develops around the corners of his mouth, just as coma reveals a dangerous degree of anoxemia and approaching death.

The natural thought is, why not give artificial respiration early and forestall these later stages? There are definite drawbacks and disadvantages to so doing. The respirator, a machine of several different types, in which the patient is placed entirely except for his head, which protrudes out through an end, accomplishes artificial respiration by means of an electrically driven pump which automatically and rhythmically raises and lowers the pressure in the respirator around the patient's chest. In the last fifteen years or so, respirators have been brought to a high degree of mechanical perfection but their use has its definite drawbacks. Patients rapidly become psychologically dependent on artificial respiration. While in the respirator, they develop improper patterns of breathing and also while they are there it is almost impossible to give them the hot applications and passive motion they should be having. Furthermore, patients with breathing difficulties who have been made to carry on without artificial respiration seem to have better chests afterward and a lesser tendency to a complicating atelectasis than those who have been put in respirators. Bulbar patients with much mucus in the pharynx practically invariably do badly in a respirator unless tracheotomy is first done and suction is used to keep the trachea clear of mucus.

However, there are three clear indications for the use of artificial respiration. The first one is to relieve the patient who is on the verge of coma due to anoxia, who, despite nasal oxygen, is developing twitching around the corners of his mouth. He needs immediate help. The second is to benefit the acutely ill patient who, because of a moderate but definite difficulty in breathing, has been without sleep for several nights and is getting tired. He must have the sleep which only artificial respiration will permit. The third, is to help the patient who has been in a respirator and is out by day but cannot sleep at night due to the continual muscular effort required for breathing. He must have artificial respiration each night or every other night so that he, too, may have the rest that only sleep can bring.

At this point it must be noted that sedation of any sort is strongly contraindicated both for the patient who at any stage of the disease is having breathing difficulty and for the patient with an acute condition who may develop it. Artificial sleep may suppress a patient's essential efforts to breathe, and patients have ceased breathing in their sleep when the sleep was forced on them by sedation.

To be able to use a respirator properly, both doctors and nurses should have special training, including being themselves put in a respirator for a short period —a very educational experience. In general, special efforts should be taken to see that the patient is made as comfortable as possible both in mind and body.

The postoperative course was uneventful. On July 23, 1945 (fourth postoperative day), a barium meal was given and x-rays of the duodenum and biliary tract taken. Later, on July 30, 1945, diodrast was injected into both drainage tubes (common duct and gall bladder). This showed narrowing of the second portion of the duodenum as before, and a ready connection between the common duct, hepatic duct, and both drainage tubes, with questionable filling of the gall bladder. On August 16, about four weeks after the first operation, it was considered advisable to re-explore the child. The operator was not certain that the diverticulum was of the gall bladder, but felt that it must be, as radiologically there was no evidence of a diverticulum of the duodenum. It was believed, however, that the primary operation had not eliminated the cause of the prolonged jaundice and abdominal pain. Therefore, a cholecystectomy was decided upon. On opening the wound, the cholecystostomy tube went into one branch of the biped organ. The second branch, which was markedly bound down, proved to be the other branch of the diverticulum. It was adherent to the duodenum and was about 4 by 3 cm. in diameter. The wall was quite thickened. Both of these organs came together just above the cystic duct so that it was possible to remove them with exposure of the cystic duct and ligation thereof. The gall bladder was removed and contained some biliary gravel. The pathologic report was as follows: "Gall bladder with two sacs connected by a small passageway about 1 cm. in diameter. This is probably a congenital malformation with double sac and possible infolding of liver tissue attached."

The child had a satisfactory convalescence, and about four weeks after the second operation, was discharged in good condition. On discharge, his icteric index was 6.2 and the hemoglobin was 80 per cent with a white blood count of 8,000. He was seen June 18, 1946. He had gained 10 lb. and had no complaints.

REFERENCES

1. Boyden, E. A.: The Phyrigian Cap in Cholecystography; a Congenital Anomaly of the Gall Bladder, Am. J. Roentgenol. 33: 589, 1935.
2. Bryan, L: Double Gall Bladder, Radiology 35: 242, 1940.
3. Golob, M., and Kantor, J. L.: Double Gall Bladder: Two Cases, Am. J. Digest. Dis. 9: 120, 1942.
4. Walters, W., and Snell, A. M.: Diseases of the Gall Bladder and Bile Ducts, Philadelphia, 1940, W. B. Saunders Company, pp. 33-34.

The patient is put to bed on a firm mattress with a bed board immediately beneath it to prevent sagging of the mattress and particularly of the patient's back. He is dressed in a minimum of clothing, perhaps a loin cloth, and a pajama shirt put on backward and thus easily removable. A vertical board at the foot of the bed keeps the weight of the bedclothes off the patient's tender legs and can later be used for postural training. Older children and adults are encouraged to lie on their backs with their feet against the footboard and with a slight blanket roll under their knees to take some of the strain off the lumbar region and prevent hyperextension of the knees. No pillow is allowed under the head because it would increase the tension of the posterior neck muscles. Little children are allowed to choose any position in which they are most comfortable, usually a side position with hips and knees flexed. When comfortable, any person, sick or well, is more relaxed than when uncomfortable.

Proper isolation measures are at once instituted, varying according to the regulations of the local health authorities. Since the virus has been found in the secretions of the nose and throat for the first four or five days of the fever, respiratory precautions should be observed for the duration of the fever and a day or two more. This means that gowns are worn and all the details of a proper isolation technique are carefully observed. Masks are thought by many to give a false sense of protection and to be more harmful than helpful. They are not used on many poliomyelitis services.

Because the virus is found in the stools of patients an average of two or three weeks but occasionally longer, regulations usually call for sterilization of the stools during the isolation period. Inasmuch as most of the patient's contacts are also probably passing the virus in their stools without any supervision or control, it would seem futile to sterilize one person's stools and ignore those of many others. However, people caring for patients with acute poliomyelitis should remember that the stools contain virus, and wear rubber gloves while handling contaminated bed pans. Furthermore, open privies should be heavily chlorinated, and also well screened against flies, which have been proved to be able to carry the virus and to infect clean food.

The patient being properly put to bed and isolated, he should be provided as much rest and comfort as possible without the use of sedation. Sleep should never be disturbed for routine measures. Examinations should be at a minimum, and handling should always be gentle. Pain is in part responsible for the patient's increased muscle tensions, and should be combatted. For this, moist heat, in the form of hot packs is very helpful. These packs are usually of three layers. The layer applied to the patient is a double thickness of wool, such as a blanket, cut to fit the muscle groups that are tight. The next layer is some waterproof material such as koroseal or a piece of a shower bath curtain, and the outer layer is another piece of wool to hold in the heat. The packs are perhaps most effective when wrapped around the affected parts of the extremities and of the body, but laid-on packs applied to the neck, back, and lower extremities of the patient in the prone or face-down position, and repeated every fifteen minutes for an hour, and for three or four such hours a day, are also beneficial

and the liver and spleen were not palpable. There was definite right lower quadrant tenderness with guarding. No costovertebral angle tenderness was elicited. Moderate phimosis was present. The extremities showed no edema or wasting, and the reflexes were normal. Laboratory results were as follows:

Tuberculin 0.1 mg. intracutaneous was negative in twenty-four and forty-eight hours.

Blood: Nov. 6, 1944, hemoglobin was 13 Gm. per cent; red blood cells, 4 million; white blood cells 22,000, with 85 per cent polymorphonuclears and 15 per cent lymphocytes.

Urine: Nov. 6, 1944, the voided specimen was of amber color, and turbid with a pH 5.5, albumin 4+, sugar negative, and acetone negative. The sediment was granular casts 1 per high dry field, hyaline casts 2 per high dry field, broad casts 1 per high dry field, 3 blood cell casts, 50 to 70 white blood cells per high dry field and 50 to 70 red blood cells per high dry field.

Blood: Nov. 18, 1944, the hemoglobin was 8 Gm. per cent, white blood cells 36,000.

Urine: Nov. 8, 1944, showed no change from Nov. 6, 1944. Nov. 14, 1944, albumin 3+, pH 5, specific gravity 1,000. Sediment showed hyaline casts 1 per high dry field, granular casts 1 per high dry field, white blood cells 20 per high dry field, red blood cells 10 per high dry field. No other elements were present.

Blood: Nov. 25, 1944, the hemoglobin was 4 Gm. per cent, red blood cells 1.4 million, white blood cells 30,000, with 88 per cent polymorphonuclears, no eosinophiles, 8 per cent lymphocytes, and 4 per cent monocytes.

Urine: Nov. 23, 1944, it was grossly bloody with a specific gravity of 1.008, albumin 2+, pH 5.8. Sediment showed white blood cells 75 per high dry field, a few hyaline and granular casts, red blood cells 100 to 150 per high dry field.

(No Addis count could be done accurately because the specific gravity was not over 1.010 when there was a measurable amount of urine.)

Blood: Nov. 10, 1944, blood urea, 363 mg. per cent; Nov. 10, 1944, blood serum creatinine, 4.7 mg. per cent; Nov. 14, 1944, blood urea, 227 mg. per cent; Nov. 16, 1944, serum proteins, 5.8 Gm. per cent; Nov. 18, 1944, blood urea, 339 mg. per cent; Nov. 20, 1944, blood urea, 128 mg. per cent.

The diagnostic impression on entry was acute glomerulonephritis or periarteritis nodosa.

Course.—The patient had a severe nosebleed the second hospital day and continued to complain of abdominal pain. Because of oliguria he was given fluids by vein, mainly 10 per cent dextrose in distilled water. Five days after entry he began to show definite periorbital edema as well as edema of the legs and genitalia. He vomited about 150 c.c. of bright red blood. Râles were heard in the lower left lung field. By this time he no longer had oliguria. The next day penicillin, 15,000 units every three hours, was begun and continued for nine days without benefit. The surgical opinion on the eighth hospital day, obtained because of abdominal distention and severe generalized abdominal pain, was that he had partial ilius with edema of the peritoneum and bowel as well as free fluid in the abdomen. On the fourteenth hospital day, he had difficulty in breathing and was found to have a pulse of 105, blood pressure of 150/100, with dullness to percussion, moist râles, and diminished breath sounds at both lung bases. Since he had signs of cardiac failure, he was given cedilanid in appropriate doses and seemed better the next day. On the nineteenth hospital day he had signs of peritonitis with rebound tenderness, and only slight peristalsis. He was given a transfusion of 500 c.c. of whole blood slowly but continued to go progressively downhill. A muscle biopsy was scheduled but the patient died on November 29, before this could be performed.

sion. A curare product known as intocostrin is rapid in its action, and, depending on the route of administration, takes but a few minutes to cause relaxation. Because its effect also wears off quickly, the possible relaxation obtained from its use is very temporary and the margin of safety is narrow. Another preparation known as tubocurarine is administered in peanut oil, with the result that such relaxation as it produces lasts more than twenty-four hours. The use of any curare preparation in poliomyelitis is not sufficiently standardized to be recommended as yet, and there have been unfortunate accidents resulting from its injudicious use. The drug should have much more study under properly controlled conditions before being advocated for general use.

Neostigmine, the pharmacologic antidote for curare, lowers the barrier at the motor end-plates and hence facilitates the passage of stimuli from the central nervous system to muscles. Its use for the relief of spasm is not yet substantiated. On the contrary, when used in Parkinson's disease, it markedly increases muscle tension. Theoretically, in poliomyelitis it might make it easier for the few remaining healthy neurons innervating a particular muscle to function, and in actual use after spasm has gone, it occasionally seems to increase endurance as shown by repeated motions, but there is no increase of strength. The drug's field of usefulness in the treatment of acute poliomyelitis is not yet established.

Thus far in this account of the treatment of acute poliomyelitis the measures recommended have been those which will be carried out by the pediatrician, and the nurse or mother. But in the subacute stage, and even in the presence of the fever of the acute stage, other specialists should play a part in the care of the patient and it is well for the pediatrician to know when to call on them and what to expect of them.

As soon as the diagnosis of poliomyelitis is made, and it is found that there are no bulbar or breathing difficulties, it is well to have the physiotherapist visit the patient to make his acquaintance and start to attract his confidence and friendship. An attempt may be made to determine and record the extent of muscle spasm on a so-called flexibility chart, but in order neither to fatigue nor hurt the patient, the physiotherapist does this very gently and in several installments. When the fever is essentially gone, the physiotherapist may begin gentle passive motion of the extremities in what is known as tendon stimulation, but she always does less than will cause the patient fatigue and discomfort. Then, as the days or weeks pass and tenderness and spasm disappear, this specially trained worker is given a larger and large proportion of the care of the patient as she leads the patient through the steps of passive motion, active motion without weight bearing, exercising for control, then functional exercising, and finally exercising for strength, and for social rehabilitation.

The efforts of the physical therapist can early be supplemented by occupational therapy. A psychiatrist also is often most useful in helping both the patient and his family to prepare for a life which may have great restriction—for moving, figuratively speaking, "from an old familiar room to a new room which must be furnished as best one can." Thus did a famous preacher put it to a young lady obviously destined to be terribly restricted by her poliomyelitis.

The "telescopic urine sediment," which appears to be a characteristic of the group of vascular inflammatory diseases (angiitis) to which periarteritis nodosa belongs, and which are so difficult to diagnose during life, is a valuable diagnostic aid that deserves wider recognition.

Krupp[3] has made important observations on the value of urinalysis in establishing a diagnosis He reported that fourteen out of twenty-one patients with visceral angiitis had specific urinary findings. In our own case it was the urinary sediment that suggested periarteritis. Krupp included under the heading of visceral angiitis, lupus erythematosus and Libman-Sachs Disease, as well as periarteritis nodosa. He pointed out, however, that the similarity in urinary sediment did not necessarily imply a common etiological agent in these three conditions. According to Krupp, the urinary sediment in visceral angiitis shows simultaneously the changes found in all three stages (Addis classification) of glomerulonephritis; this is the so-called "telescopic sediment." Thus one may find red blood cells, white blood cells, red blood cell casts, oval fat bodies, granular casts, hyaline casts, and broad casts in a single urinary sediment from these patients, accompanied by large amounts of protein. It is of interest that 80 per cent of patients with periarteritis nodosa show definite renal changes.

SUMMARY

A case of periarteritis nodosa with necropsy, in a 10-year-old boy is reported

REFERENCES

1 Keith, H. M., and Baggenstoss, A. H. Primary Arteritis (Periarteritis Nodosa) Among Children, J. PEDIAT 18: 494, 1941

2 Rothstein, S. L, and Welt, S.. Periarteritis Nodosa in Infancy and in Childhood, Am. J. Dis. Child. 45: 1276, 1933.

3. Krupp, M. A.: Urinary Sediment in Visceral Angiitis (Periarteritis Nodosa Lupus Erythematosus, Libman Sachs "Disease"), Arch. Int Med. 71: 54. 1943.

sixteen times more frequent in children who have had recent tonsillectomies than in others. Hence, the removal of tonsils and adenoids should be postponed until the epidemic is well past. It is possible that a tooth extraction may open a portal of entry, and there are those who suspect even the common cold as facilitating the passage of the virus through the mucous membrane.

4. There is no advantage in using drugs, chemicals, sulfonamides, antibiotics, or such mechanical measures as nose drops or gargles in an attempt to ward off the infection. There is no evidence that any such supposed preventive is of value.

5. The use of any water that is possibly contaminated with sewage for drinking, swimming, or washing utensils, should be avoided. The virus has been found in sewage-contaminated streams, but water borne epidemics have not yet been proved.

6. Similarly, flies should be destroyed and food should be kept protected from flies. It has been proved that flies collected in an epidemic area can harbor the virus and can infect clean food sufficiently to pass the infection on to monkeys fed this food.

7. *Unnecessary personal contacts should be avoided.* Close contact undoubtedly increases the dosage of an infection, so congested places should be avoided, and such acts as the sharing of a lollipop or whistle, or of a drinking glass should be omitted. There is probably little to be gained by running away from an epidemic; one is probably already infected. On the other hand, one might well hesitate before moving from a clean community to an epidemic area.

SUMMARY

An attempt has been made to describe measures which should be instituted when a doctor undertakes to care for a patient with acute poliomyelitis, and why these measures are indicated. The care of those patients where life is most in danger, that is, of patients with bulbar and respiratory difficulties, is first described, followed by that of patients with the more common and less urgent spinal form. How the efforts of various specialists are tied together, is followed by mention of the importance of looking for otherwise unrecognized cases in the patient's family. Finally, some suggestions are given for prophylactic measures to be observed in the presence of an epidemic.

Hence, when a patient is recognized as being a bulbar case, with imperiled cardiac and respiratory centers and with loss of ability to swallow, his two great needs are that the condition of the pulse and blood pressure be closely watched and controlled, and that the pharynx be kept clear of accumulations of mucus. These patients are apt to be very restless and yet they should have quiet and rest; hence, skillful nursing care is of the utmost importance. The old adage: "If you don't know what to do, do nothing," holds true. Wrong treatment does more harm than no treatment. It is obvious, however, that the mucus must be removed. The foot of the bed is raised to obtain postural drainage, and the patient is placed either on his side or his abdomen. Repeated, gentle suction is usually necessary, and if there is much mucus seeping into the trachea or forming there, suction through a laryngoscope or a bronchoscope may be necessary. Even a tracheotomy to by-pass the mucus and to enable repeated suction through the tracheotomy tube has been considered lifesaving in some clinics.

To support the bulbar centers, the early use of oxygen is very beneficial. Because oxygen tents and masks make it very difficult to keep the pharynx clear of mucus, it is best given by nasal catheter, a procedure which, if skillfully done, is of slight, if any, discomfort to the patient. The oxygen should first pass through a watertrap, then through a soft rubber catheter, which, after being lubricated, is gently inserted in the patient's nostril a distance one and a half inches less than the distance from the nostril to the external auditory meatus, in the adult. This distance is previously measured along the patient's cheek and in children is about a half inch shorter than in adults. The oxygen should be flowing gently through the catheter at the time of insertion, and after installation the rubber tubing should be bent straight up to the forehead and fastened there with adhesive, rather than laterally to the cheek, the former position being much more comfortable for the patient. When the catheter is comfortably in place, the flow of oxygen is then increased to an amount sufficient to prevent cyanosis, usually from 4 to 6 L. per minute.

Of drugs intended for bulbar stimulation, the best is caffein, which should be given in doses of 10 mg. of the sodium citrate per kilogram of bodyweight, either subcutaneously or intravenously, and repeated every one-half hour if necessary. For falling blood pressure, neosynephrine by hypodermic in doses of $\frac{1}{10}$ mg. per kilogram may be of additional assistance.

Difficulty in swallowing should be respected and nothing should be given by mouth lest the food or fluid be aspirated by accident into the trachea. However, the patient's fluid intake must be preserved, and intravenous fluids are given. A hypertonic solution of 10 per cent glucose is given first in the hope of reducing edema of the central nervous system, from 500 to 1,000 c.c. being given to an adult. This is followed by enough 5 per cent glucose, some in saline solution, to give the average adult an intake of perhaps 2 L. of fluid a day. More seems to increase the tendency of the pharynx to be flooded with mucus and saliva.

When the inability to swallow persists more than two or three days, it is well to try to pass a well-lubricated Levine tube through a nostril down into the

we found was in the skull film. In the central portion of the skull on the right side, there is, apparently, a small area of calcification. We asked for a right stereoscopic view to see if we could localize it more definitely. We feel that it will not be significant when we get it, but that it should be traced down to be sure of the possibility that there may be calcification within the brain. As well as one can tell, the chest film with its double exposure taken in expiration rather than inspiration does not appear abnormal. The outer lung fields are clear; the cardiac shadow is not unusual.

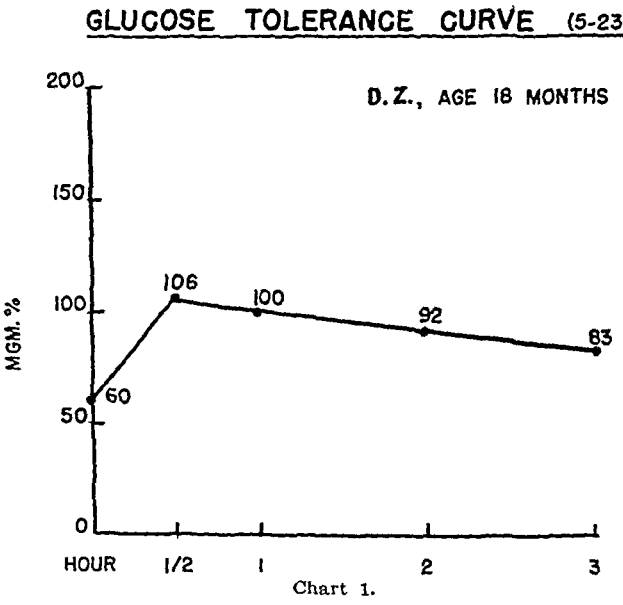


Chart 1.

DR. ALEXIS HARTMANN.—You do not think the calcified area in the skull film is artifact?

DR. LITTLE.—It well may be.

DR. HARTMANN.—Do you think the sella turcica is within normal limits?

DR. LITTLE.—Yes.

DR. ZENTAY.—Is there any abdominal mass visible?

DR. LITTLE.—No, we could not see any. The gas pattern was well distributed, and didn't seem to be displaced by any solid mass. The kidney shadows could not be made out. The psoas shadows are of good outline.

DR. ZENTAY.—We hoped that Dr. Allen would discuss this case, but he is unable to be here. As you remember from the history of this child, there was a tremendous somatic growth; actually, the child gained 13 lb. in about six or seven months, and the external genitalia, including the clitoris, definitely showed the tendency to male development. There is marked hirsutism not only

clear passageway to the lungs. Tight muscles can be relaxed appreciably and often rapidly by hot, moist heat. The patient usually can be led to cooperate. And finally, if the patient hasn't enough muscle power to inhale and exhale, he must have artificial respiration.

Hence, when bulbar manifestations predominate in the breathing difficulty, the initial treatment is as just described for other bulbar cases, using oxygen, postural drainage, suction, and caffein. Where these measures are not sufficient and the patient is showing increasing difficulty in obtaining sufficient oxygen, tracheotomy done under local anesthesia may prove lifesaving by providing a by-pass for oxygen to the lungs, especially when the vocal cords are relaxed together or when there is much mucus in the trachea. Suction through the tracheotomy tube, especially if combined with gentle irrigation with a sterile sodium bicarbonate solution, can be used to keep the trachea clear. Then, moistened oxygen can be fed gently to the tracheotomy tube through a four-way connecting tube which permits oxygen to enter the trachea during inspiration, and, during expiration, to pass through a water bottle, which offers just enough resistance during inspiration to prevent the escape of oxygen by this passageway. This use of tracheotomy tube and oxygen was employed extensively and with considerable success in Minneapolis during the 1946 epidemic when an unusually high percentage of the cases was bulbar in type and many of these patients had breathing difficulties.

Spasm of the muscles of breathing is almost always a factor in poliomyelitis patients with breathing difficulties, and many patients can be relieved greatly by hot wool compresses laid lightly on the chest and abdomen, and changed about as rapidly as freshly heated pieces can be supplied. Most hospitals have special equipment for heating and wringing these compresses, but in homes they can be prepared satisfactorily by cutting old woolen blankets into suitable pieces, which are then boiled and, when boiling hot, are passed twice through an ordinary laundry wringer. This leaves them still hot but dry enough so that they won't burn. When no wringer is available, satisfactorily hot compresses can be prepared by rapidly ironing with a very hot iron, at the patient's bedside, the pieces of blanket which have been wrung out of water as hot as can be tolerated by the hand.

Many patients who seem to be progressing toward the stage where artificial respiration is necessary can be kept breathing adequately by the use of oxygen and hot compresses. Where there are bulbar manifestations, it is particularly important that this be done if possible. But in patients with the spinal form with failure of innervation of the intercostals and diaphragm, artificial respiration becomes necessary at times.

Doctors of wide experience vary greatly in their opinions concerning when artificial respiration should be given. Some would use it at the earliest evidence of breathing difficulty; others postpone its use until the last moment before coma appears. There are advantages and disadvantages to both usages, so that in any given case the decision as to when to start artificial respiration must depend on a number of factors.

ventricle or in the midbrain, or tumors in other parts of the brain interfering with the midbrain may cause sexual precocity. There have been cases described where encephalitis, particularly the type of encephalitis that we used to see twenty years ago (the type A or von Economo type), seemed to lead to precocious sexual development. Tumors of the hypophysis may cause sexual precocity, but again there is a question as to whether the internal secretion of the anterior lobe or disturbance of innervation coming from the midbrain is responsible for the sexual development.

The other form particularly emphasized by Novak is the so-called constitutional type of sexual precocity. Here the important thing is that the child is perfectly normal in every other respect. There is no change in body structure, but at any age, as early as a few months or a few years, the development of secondary sexual characteristics (increase in the size of the breasts and development of pubic and axillary hair) begins. These are the children who may become pregnant. You remember the Peruvian child who, at 5 years of age, delivered a perfectly normal baby. There are other reports in the literature of very early pregnancies. These girls menstruate very early, and in contrast to cases of sexual precocity due to ovarian tumors or other causes they not only menstruate but also ovulate, and, therefore, there is always danger of insemination. These children, in spite of their sexual precocity, grow and develop normally, and are normal by the time they reach the usual age of puberty, and no further difficulty arises. The cases which Novak calls constitutional sexual precocity present no serious problem from the point of view of physical development of the child, but they pose important social and psychologic problems, because these girls naturally become very conscious of their difference from other girls and on that basis may develop all kinds of psychic difficulties. They have to be protected from that danger and also they have to be protected from the possible danger of insemination.

DR. HARTMANN.—There are two points that I would like to make, one of not very great importance, the other perhaps of more importance. The older members of the staff must remember a child seen about five years ago, E. B. Both Dr. Allen and I were struck with the resemblance between E. and this girl, and in his characteristic and thorough way Dr. Allen studied the facies of this patient, and said, "I believe the reason this child looks so peculiar is because of the well-marked eyebrows," and we promptly went around and looked at all the other children on the ward. There was no child at or near this age with anything like the eyebrow development which this child has, and I think that is what is characteristic of the expression of this girl. E. had similarly well-developed dark eyebrows. The other point that I think is of some importance is this: chances are that this will be an adrenal tumor. Dr. Allen thinks so, and I think you do, Dr. Zentay, and so do I. In any case, a laparotomy will be performed, and if the tumor is found, we expect it to be a unilateral one, and it will be removed. At the moment this child is suffering from hyperadrenalism, and when the adrenal tumor is removed there will still be a normal adrenal left, but the child will then suffer from hypoadrenalism.

If there is time, he should be tactfully and reassuringly prepared for the experience, and he should be told someone will be constantly at his service. As he is placed in the machine, soft cloths must be used to keep the rubber collar from rubbing on his neck. A large pillow placed under his knees makes his back much more comfortable. In running the machine, negative pressure should be used and the amount of pressure and the rate of the machine should each be adjusted to the patient's comfort. Most adults do well at fourteen to sixteen breaths a minute and a negative pressure of 12 to 14 cm. of water. Occasionally the use of a respirator for only thirty to sixty minutes at a time is sufficient to rest the patient and to enable him to breathe again for a time with the help of oxygen only. However, most patients, once they are in a respirator, like so well the relief from the effort of breathing that artificial respiration has afforded, that it becomes very difficult to wean them from the machine in less than two or more weeks.

When artificial respiration is imperative to maintain life and a respirator is not immediately available, breathing can be maintained by manual artificial respiration, or with less effort by means of a seesaw. If the patient is tied on a window shutter or ironing board which is then balanced over a horizonal banister or the high foot of a bed, respiration can be maintained by the slow, rhythmical, gentle tilting of the seesaw, each elevation of the patient's feet causing the abdominal viscera to push the diaphragm up and each lowering to pull the diaphragm down.

Such are the measures which one may use in an attempt to tide the seriously ill patients over the acute stage of the infection. Fortunately, in most epidemics, patients with bulbar or respiratory difficulties comprise a small minority of all cases. Most of the patients with recognizable weakness are pure spinal cases, that is, have no evidence of bulbar involvement, and there are many more additional patients whose condition can be recognized as "acute poliomyelitis without paralysis," if this diagnosis is kept in mind as a possibility whenever there is poliomyelitis about. When a patient develops fever, vomiting, some tightness and tenderness of the neck, back, and hamstrings, irregular reflexes tending to disappear, and twitchings and tremors of various muscles, a lumbar puncture should be done, unless definite paralysis also is present, making the diagnosis fairly obvious. If an increase of cells in the spinal fluid is found, numbering possibly twenty to 200 or 300 or more, this added circumstantial evidence strongly suggests the diagnosis of poliomyelitis. This being a virus disease, the blood count is usually that of any virus infection; there is little if any increase in the total number of leucocytes or of the percentage of polymorphonuclear neutrophiles. An appreciable leucocytosis should give warning of a possible complicating bacterial infection. There is no pathognomonic symptom, sign, or useful clinical test to confirm the diagnosis.

Thus, when a doctor has satisfied himself that there is no immediate danger to life, that the patient has neither bulbar nor respiratory difficulties and yet apparently has definite poliomyelitis with or without paralysis, he then outlines and institutes the details of treatment somewhat as follows:

Microscopically the tumor was seen to be made up of cells which had a polygonal shape, eosinophilic cytoplasm, and a very distinct cellular wall. The nuclear elements were round to oval, and for the most part slightly hyperchromatic; some of the cells, however, showed a syncytial arrangement with three to four large vesicular nuclei lying within the eosinophilic cytoplasm. The cells tended to grow in cords and strands, between which small vascular capillaries could be seen. In some areas the cytoplasm of the cells tended to be clear or slightly granular. No mitotic figures were found. There was a very well-defined capsule, and no tendency for the cells of the tumor to invade the capsule. The skin showed only some increase in the number of hair follicles. There was also some increase in the keratin material on the surface of the skin. The skeletal muscle appeared to be perfectly normal. On the basis of these findings the clinical diagnosis of adenoma of the adrenal cortex was confirmed.

Case 2. Histoplasmosis

DR. JOHN MARTZ.—This child, 3 years old, weighed 8,400 Gm. She had apparently been a normal healthy child until April, 1946, when she developed whooping cough which was complicated by pneumonia. At that time she weighed 32 lb. She was acutely ill for about a month. Following the attack of whooping cough, she continued to have recurrent bouts of fever (during the summer of 1946) associated with listlessness and profuse sweating, but she gained a little weight. Approximately six weeks before admission she began to lose weight and appeared very listless. She was hospitalized at that time in her local hospital and treated with penicillin and blood transfusions because of marked anemia. During this period she developed rather severe diarrhea; she passed numerous, greenish, watery, foul-smelling stools in which, at times, small flecks of blood were seen. X-rays taken during this episode revealed osteolytic processes of the clavicle, skull, and both femurs. At the time of admission to Children's Hospital the patient was markedly malnourished, dehydrated, and athreptic, but was mentally alert. There was bleeding of the lips, gums, and finger nails. There was general lymphadenopathy, most prominent in the cervical glands, which were firm and shotty but discrete. There was a large area of ecchymosis over the left thorax posteriorly. Many white patches were seen on the tongue and buccal mucous membranes. These could not be rubbed off easily. Fluoroscopy of the chest revealed haziness of both lung fields but no notable change in the mediastinum. The temperature was normal. The urine showed a trace of albumin with occasional white blood cells and granular casts. The hemoglobin was 14.4 gm. red blood cells 6,000,000, white blood cells 4,400 with an adequate number of platelets and a marked shift to the left in the differential, showing 2 juveniles, 70 stab cells, 25 segmented cells, and 2 lymphocytes. There were two nucleated red blood cells per 100 white blood cells, and the red blood cells appeared microcytic. The Kline test was negative. The first stool passed after admission was large, quite watery, and very foul-smelling, and contained a moderate amount of blood. The child was given a regular diet, but the diarrhea immediately became quite severe, and the diet was changed to

and involve very little actual handling of the patient. In either case, the inner layer of the pack should be boiling hot and then passed twice through a tight wringer, or the wool may be steam heated.

The use of hot baths as advocated by Gurewitsch is also very beneficial and often more easily accomplished. The patient is gently placed up to his neck in water at body temperature and then hot water is added to raise the temperature of the bath to 104° F. The patient is kept in this for fifteen minutes but cold cloths or an ice bag must be applied to his head, and as for all patients whose treatments cause much perspiration, fluid and salt losses must be replaced by the administration of large quantities of fruit juices and water and a salt tablet. Because of the danger of fainting, a patient in such a bath should never be left alone, even for only a moment.

In homes where neither packs nor tubs can well be arranged, an ordinary cotton sheet wrung out of cool tap water at 60 to 65° F. can be wrapped about a naked patient, folds of the wet sheet being tucked between the legs, and between the arms and the body. A blanket is then wrapped around the patient from his head to beyond the toes and, except in hot weather, a second blanket is laid on top. In ten minutes the patient is warm and beginning to perspire, and presently the patient may relax and fall asleep. Such packs can be applied twice a day and can be left on two or three hours each time. They are especially helpful for restless little children and for patients with a wool idiosynerasy.

Particularly in the acute stage of this disease, the patient's ability to empty the bowel and bladder should be noted carefully. Adolescent boys are particularly likely to be unable to void and frequently have to be helped with catheterization. Where the difficulty persists more than a day or two, it is usually wisest to install a self-retaining catheter and to administer small doses of sulfadiazine by mouth for urinary antisepsis. For apparent constipation, cathartics often cause increased intestinal peristalsis and cramps without accomplishing an emptying of the rectum, and it is wiser during the acute stages of poliomyelitis to depend solely on sodium bicarbonate enemas given every other day. In the subacute and chronic stages, milk of magnesia may be tried.

The use of the stimulants oxygen, caffein, and neosynephrine has already been mentioned. Of other medications, aspirin may be used freely if desired and makes a fair proportion of patients more comfortable. It is best given with an equal amount of sodium bicarbonate, and when there is some food in the stomach. Any acutely ill patient, even one without apparent evidence of breathing difficulty, may, in the course of two or three hours, develop enough weakness or tightness of the muscles of breathing to necessitate conscious effort on the part of the patient to keep going, hence sleep-producing medication for such a person is strongly contraindicated because he may stop breathing in such sleep. This prohibition cannot be repeated too often.

Of drugs intended to relax spasm, two might be mentioned, not for recommendation as yet, but because of an already wide interest in each. The first, curare, acts in effect to raise the barrier to nerve stimuli at the motor end-plates, and hence shuts off some of the motor impulses that are increasing muscle ten-

axis of the intestine. These lesions were ulcerated centrally and were firm and yellow at the periphery. Some of the ulcers were hemorrhagic. Similar lesions were found in the colon, in the appendix, and in the rectum. We also found masses of large yellowish nodes about the pancreas. A few of these showed small foci of caseation. We examined the medial portion of the right clavicle, and the central portion of the bone seemed somewhat soft. Examination of the calvarium showed several translucent areas in the frontal and parietal bones, circular in shape and approximately 1 cm. to 1½ cm. in diameter. There was no appreciable difference in the consistency of the bone in these areas.

Histoplasma capsulatum was cultured from the lymph nodes by Dr. Beamer.

DR. MARGARET SMITH.—The distribution of the pathologic changes appears to be of significance in relation to the route of entry of the organism. I think the fact that there is a marked involvement of the intestinal tract and the mesenteric lymph nodes and the cervical lymph nodes, but no involvement of the mediastinal nodes or of the lungs, is of interest. The other cases that we have observed in children fall into two groups: one in which the lungs were extensively involved with little change in the intestinal tract, the other with marked involvement of the intestinal tract with much less conspicuous change in the lungs. In this case, as far as the gross changes are concerned, there is nothing in the lungs or in the mediastinal or tracheobronchial lymph nodes. It seems almost inescapable that the route of entry here must have been through the intestinal tract rather than through the lungs. Another thing that we thought to be of interest was the very marked involvement of lymph nodes in the mesentery and the quite remarkable pattern in the intestinal mucosa apparently due to filling of the lacteals and lymphatic spaces with organisms.

Slide 1.—This is a section of one of the abdominal lymph nodes. The section shows destruction of the normal architecture of most of the gland. The sinuses are filled with large cells. There are foci of necrosis, and throughout the nodes, not only in the lymph sinuses but in the lymph cords, are large mononuclear cells and a small number of multinucleated giant cells. In some parts of the section a few small lymph follicles can be seen, but in general the architecture of the node is entirely replaced by the granulomatous reaction.

Slide 2.—This is a large multinucleated giant cell such as was seen in the sinuses of the node. We see the many encapsulated yeastlike organisms in this large cell. One sees the definite capsule of the organism and the central yeastlike body with eccentric arrangement of the chromatin material. (Fig. 1.)

Slide 3.—This is a section of an intestinal ulcer (Fig. 2) with necrosis of the mucosa and extension of the granulomatous reaction in the muscle layer. When the margin of this ulcer is examined with a higher magnification we find many of the large mononuclear cells and multinucleated giant cells containing the characteristic organism.

Slide 4.—This is a section from one of the areas which showed the fine, interlacing, yellowish lines on the surface of the mucosa in the gross. All the villi contain large phagocytic cells, some with several nuclei, and other, smaller ones with only one nucleus (Fig. 3). This type of lesion was most extensive in the jejunum. Each villus was filled with these cells without necrosis or ulceration of the mucosa.

The orthopedist has an important place, although not in the care of the acute disease. Removable plaster splints or shells have their usefulness as early as the subacute stage to prevent a restless child's keeping an extremity in a position which aggravates muscle shortening, such as sitting on his feet in plantar flexion when the calf muscles are tight. When the first weight bearing is desired, mechanical support for a very weak back, abdomen, or extremity may be necessary. And finally, at least two years after the onset of the infection, the expert and specialized services of the orthopedist are often needed for a reconstruction operation that will help in the final step of the patient's care, that of social rehabilitation.

The pediatrician's responsibility to the poliomyelitis victim's family does not end with his care of that patient. If there is a clearly recognizable case of the disease in a large family it is usual to find that several of the other children have some kind of minor illness more or less at the same time as the onset of the patient's poliomyelitis. These minor illnesses, a head cold, a slight indigestion, or a slight headache and fever, might very well be trivial poliomyelitis infection, and should be treated as such by instituting prompt and complete bed rest. By such a procedure it is possible that the infection can be kept from being aggravated into severe paralysis.

This point naturally leads to a discussion of possible prophylactic measures. When poliomyelitis is present in a community, doctors have the great responsibility of informing the lay population how, according to our present knowledge of the etiology and nature of the disease, the ravages of this terrifying infection can best be minimized. It is now believed that the virus, like that of many other infections such as measles and influenza, is easily passed from person to person and enters the contact through the nose and throat. It apparently moves on down the alimentary canal to be passed out in the stool. Under favorable conditions it invades the mucosa and travels by regional nerves to the central nervous system. In a comparatively small number of those infected, the infection is sufficient to cause an illness, and in a still smaller prooprtion to cause paralysis. In an epidemic, probably nearly everyone is infected, despite any regulations of quarantine against the spread of the illness. Hence, efforts should be directed toward minimizing the effects of the disease in those infected. Unfortunately, there is only a little known as to why one infected person escapes and another is hard hit. At the present time, the following suggestions seem reasonable.

1. Avoid exhaustion due to chilling or fatigue. Animal experimentation and clinical observation strongly suggest that persons incubating the disease who become chilled or overtired are more apt to have the severe forms of the infection.

2. Similarly, persons whose poliomyelitis has begun apparently can aggravate its ravages by not getting immediate rest. Hence, in the presence of poliomyelitis, every person with even what seems a minor illness should go to bed and obtain complete rest until quite well again.

3. The mucous membranes of the nose and throat should be kept in as healthy a condition as possible. The incidence of severe bulbar cases is some

Slide 5.—One of the large multinucleated cells in a villus (Slide 4) is seen and another smaller cell, both containing the characteristic organisms. These sections show particularly well the capsule about the yeastlike organism and the eccentric arrangement of the chromatin material within the yeastlike cell.

Slide 6.—This is a section from the bone marrow of the vertebra. There is marked interference with the formation of blood. There are few normal blood-forming cells. Many foci of necrosis are present. Large mononuclear cells occur about these foci of necrosis.

Slide 7.—This section is from the clavicle and shows again areas of necrosis with deposits of fibrin, edema of the marrow, and infiltration by large phagocytic cells containing the organisms.

Slide 8.—Shows a higher magnification of these large phagocytic cells containing a great number of organisms.

Slide 9.—This is the adrenal. I wanted especially to show this slide (Fig. 4) because the adrenal was the only one of the solid viscera that showed gross lesions. There is a large focus of caseous necrosis. One can recognize the small organisms in large phagocytic cells surrounding the area of necrosis. I think this is of some interest because among the adult cases of histoplasmosis we find that there are a number in which the lesion in the adrenal has been the most conspicuous part of the disease. We had one instance during this last year of an elderly man with an undiagnosed febrile disease and, terminally, some symptoms consistent with Addison's disease. At autopsy the most conspicuous change was in the adrenals, which were replaced by areas of caseation. There were caseous lesions in the lymph nodes and only recent small granulomatous lesions in the liver and spleen.

Slide 10.—The liver in this case showed no gross granulomatous lesions. The liver was a little large, due chiefly to congestion. The sinusoids are distended with red cells and the Kupffer's cells are quite prominent in this section. We found one microscopic granulomatous lesion. This was the only one in the section.

Slide 11.—The lung shows an interstitial bronchopneumonia, but no organisms were found.

DR. PARK J. WHITE.—Dr. Smith, will you discuss the specificity of the histoplasmin test?

DR. SMITH.—I know only what has been reported in the literature. I understand that there is some question concerning the specificity of the antigen now used and that the suggestion has been made that an antigen derived from the mycelial form of the organism may be less specific than an antigen made from the yeastlike form. The thing of interest is, of course, that many positive reactions have been observed in individuals from this part of the country.

DR. JOHN LYNCH.—As far as this test is concerned, we have done 500 here at Children's Hospital since last November, and I am not quite sure what conclusions we can draw. The percentage of positives is around 15 per cent; however, as the age increases (I think we only have three positives under 2 years of age) the percentage of positive reactors becomes as great as 50 in the older age groups (14 to 15 years). There is no correlation, as far as I can see, with the disease the patient has or with the chest film, and we have had no proved cases of histoplasmosis in the patients who reacted positively to the antigen. One interesting thing is that the positives seem to be more frequent

Clinical Conference

CONFERENCE AT THE ST. LOUIS CHILDREN'S HOSPITAL, MAY 23, 1947

DR. ALEXIS F. HARTMANN, CHIEF OF STAFF

Case 1. Adenoma of the Adrenal Cortex

DR. RICHARD HAWKINS.—The first patient is D. Z., 18 months of age. She was born at term following a normal pregnancy. Delivery was normal and the neonatal period was uneventful. She was breast fed for two months, then fed an evaporated milk formula, and had developed normally throughout infancy until about eight months ago. At that time (October, 1946) she was seen by a private physician. She seemed to be quite normal, although somewhat large for her age. Her brother is also large for his age. During the previous eight months the patient seemed to be growing rapidly. The patient was seen again last week, and the examining physician noticed a profuse growth of pubic hair and a very great increase in height and weight. The parents stated that about three months prior to the last visit the patient had begun to develop a growth of pubic hair which had increased progressively. The parents had noticed the rapid increase in height and weight. When questioned about the pitch of the baby's voice, they stated that it had become somewhat husky during the last three months. The patient was hospitalized for observation and treatment. On admission here, physical examination revealed a child who was large for her age and plump; the skin was darkly pigmented throughout, but the father is also of dark complexion. The eyebrows were dark, there was hair on the upper lip and a little growth of hair about the nipples with no breast tissue present. The examination of the abdomen revealed no masses and no palpable viscera. About the genitalia there was a striking growth of pubic hair with distribution of the male type, and in addition there was a growth of vulvar hair. The labia majora were large; the clitoris was greatly enlarged for this age. The remainder of the examination was not revealing.

The urine was normal; hemoglobin was 16.9 Gm.; white blood cells were 11,950; the red blood cells appeared normal on stained specimen. A glucose tolerance test (Chart 1) gave the following results: 60 per cent at fasting; at ½ hr., 106 mg. per cent; at 1 hr., 100 mg. per cent; at 2 hr., 92 mg. per cent; at 3 hr., 83 mg. per cent. During the past seventy-two hours she has been on total urine collection. Dr. Allen's laboratory will do 17-keto-steroids and also test quantitatively for pregnandiol. X-rays of the skull, abdomen, and long bones have been taken.

DR. PAUL ZENTAY.—The enlarged clitoris resembles a hypospadias.

DR. JAMES LITTLE.—The flat plate of the abdomen showed nothing particularly abnormal, and the bone development as shown in the wrist joint was within normal limits for the child's age. The only thing of interest which

nodes, and anemia. She was hospitalized elsewhere for one month. She presumably had transfusions while there. The hematological findings are presented in Table I. In January, 1947, one month prior to admission, she had a sore throat and a flulike episode. Also, at that time, she lost her appetite, became listless, and seemed to become more pale.

TABLE I. S. J. T.

DATE	AGE	PERIPHERAL BLOOD									
		HGB.	R.B.C.	W.B.C.	EOS	BAS.	STAB.	SEG.	LYM.	MONO.	PLATELETS
6/ 7/44	5 months	13.7	4.64	60,850	–	1	1	19	78	1	–
6/ 9/44	5 months	–	–	–	–	–	–	–	–	–	190,000/c.mm.
6/22/44	5½ months	10.0	4.06	28,200	–	–	–	10	88	2	–
2/12/47	3 years	8.9	2.85	95,000	2	–	1	11	85	1	–
2/17/47	3 years	–	–	–	–	–	–	–	–	–	558,000/c.mm.
2/21/47	3 years	9.3	–	46,500	–	–	–	–	–	–	–
2/24/47	3 years	13.8	–	31,800	–	–	–	–	–	–	–
3/30/47	3 years	10.0	–	10,400	–	–	4	30	60	6	–
5/20/47	3½ years	3.5	1.28	66,700	–	–	2	14	84 (mature)	–	–

BONE MARROW

2/17/47—3 years
WBC—7 segmented cells, 6 stab cells, 4 metamel, 9 myels., 71 small lymphocytes, 1 large lymphocyte.
RBC—7 normoblasts, 1 early erythrobl, 6 late erythrobl.
5/22/47—3½ years
WBC—1 erythroblast/200 WBC, 5 segmented cells, 23 st., 3 metamyel, 7 myel, 60 lym.

On admission here, physical examination revealed a greatly enlarged, firm liver and a spleen reaching to the pelvic brim. Both eardrums were dull and red. There were profuse mucopurulent nasal discharge and postnasal drip. Other physical findings at that time were not of importance. Blood data after transfusion, February, 1947 (she was 3 years old at that time), were as follows: hemoglobin, 8.9 Gm.; red blood cell, 2.85 million; white blood cell, 95,000, with 2 eosinophiles, 1 stab cell, 11 segmented cells, 85 lymphocytes, and 1 monocyte. On her other hospitalization at the age of 5 months, she had had a hemoglobin of 13.7 Gm. (apparently taken after transfusion); the red blood cell count was 4.64 million, white blood cell count, 60,850, 1 basophile, 1 stab cell, 19 segmented cells, 78 lymphocytes, and 1 monocyte. On one of the previous counts, it was recorded that the lymphocytes seemed to be mostly blast forms. The platelet count at the age of 5 months was 190,000 c.mm. Her next admission to this hospital was in March, 1947, at which time she entered for adenoidectomy and transfusion. She was here only a few days. The white blood cell count at that time was down to 10,000 with still a predominance of lymphocytes in the differential, and the hemoglobin was 10 Gm. While she was in the hospital in February, 1947, she had one x-ray treatment to the spleen, and she received x-ray treatments as an out-patient during the time between admissions.

The last admission occurred four days ago. There was a history that six days before the patient had suddenly begun to look more pale than previously, had become listless, lost her appetite, and become quite irritable. This con-

in the pubic area but beginning on other parts of the body. As far as can be ascertained from our findings, the internal genitalia (we have done no pelvic nor rectal examination) appear to be within normal limits. That, of course, should be confirmed by more intensive examination. From the fact that this child has shown rapid growth, masculinizing changes, and precocious sexual development, we may assume even before we get all the laboratory data that we are dealing with an adrenal tumor. What the nature of the tumor is, we do not know. It may be benign or malignant. That can be determined only after operation is performed, and the tumor is examined and possibly removed. It is known from the few cases in the literature (there are not too many, and the whole picture of sexual precocity is still confused) that adrenal tumors do produce this syndrome, and they may occur at almost any age. A series of three cases was reported from the Henry Ford Hospital.[1] In one the process began at 4 months of age. The tumor was a malignant one arising on the face with metastasis into the adrenal gland, and it produced the type of picture seen here. The child died at 25 months of age. Other similar reports are in the literature. The older the child is, the more difficult it becomes to differentiate between the different types of tumors responsible for these changes. If Dr. Allen obtains laboratory findings which are in harmony with the physical findings, the next step will be to do a laparotomy to explore at the same time the ovaries and the adrenal glands. It seems safer to rule out ovarian tumor and then proceed at the same operation to remove the adrenal gland.

I should like to mention the different types of sexual precocity which have been described. There is an interesting article by Novak[2] who discusses the various forms of sexual precocity and also emphasizes that there are cases of so-called constitutional sexual precocity, a type which has not received enough attention in the past. Most of the cases reported in the literature are either of this type or are cases of adrenal tumors or ovarian tumors. There are several other types of sexual precocity described. There is the so-called pineal tumor. You remember we have seen a few here in recent years, and there has always been a tremendous development of the external genital organs, and a marked growth of the body in general. From our point of view, this possibility can be ignored more or less, inasmuch as pineal tumors and sexual precocity as the result of such tumors have been recorded only in boys. There is only one case reported in the entire literature in a girl, and that is questionable. The problem of mechanism of action of the pineal body tumors still remains: that is, whether the effect is produced by internal secretion of the pineal or by pressure of the tumor on the midbrain and regulating centers in the midbrain. There are two types of ovarian tumor, granulosa cell and theca cell, known to cause sexual precocity. The difference between the adrenal tumors and ovarian tumors lies in the tendency of ovarian tumors to produce a more feminine type of sexual precocity. There is usually well-defined vaginal mucosa, sometimes discharge, and menstruation may begin very early. Usually the ovarian tumor can be palpated and can be demonstrated on operation. After removal there usually is a great deal of improvement. Then there is the so-called cerebral type of sexual precocity. Tumors in the cerebrum, particularly in the fourth

mature lymphocytes. In the differential diagnosis, some of the conditions that cause leucemoid reactions with lymphocytosis should be considered. Certain infections, such as pertussis, congenital lues, and chickenpox, are not infrequently associated with hyperleucocytosis with an absolute increase in lymphocytes. Leucemoid blood pictures are also seen in various intoxications, such as mercury or benzol poisoning. Of the malignancies that are sometimes associated with a leucemoid blood picture, Hodgkin's disease should be considered. The clinical picture is not out of keeping with such a diagnosis. However, in Hodgkin's disease there never is an absolute increase in the lymphocytes, and the bone marrow never shows an invasion with lymphocytes such as is seen in this case.

This is not a case of chronic or acute infectious lymphocytosis. Cases of chronic infectious lymphocytosis as described by Smith are characterized by prolonged upper respiratory infection with low-grade fever and minimal enlargement of the cervical lymph nodes. In Smith's nine cases, the counts range from 5,000 to 15,000, with some 35 to 80 per cent lymphocytes. Acute infectious lymphocytosis occurs most commonly without any signs or symptoms. There is hyperleucocytosis with 71 to 97 per cent lymphocytes. Within four to eight weeks, the blood picture is back to normal. Acute infectious mononucleosis can be excluded on many grounds. In infectious mononucleosis it is very rare for the leucocytes to exceed 40,000. This child has never shown an increase in the heterophile antibody titer, and at no time did the mononuclear cells suggest those typical of the disease. We now take into consideration the leucemias. Acute leucemia can be excluded in the absence of severe anemia, thrombocytopenia, and immature lymphocytes in the blood and bone marrow.

The prolonged course, the physical findings, and the laboratory studies are all in keeping with the diagnosis of chronic lymphoid leucemia. On careful analysis, all reports of chronic lymphoid leucemia in children actually represent cases of acute leucemia of prolonged duration. Chronic lymphoid leucemia, as it occurs in adults, has to my knowledge never been reported in children. It is difficult to explain the sudden onset of extreme pallor in this case. Severe progressive anemia is expected in the later stages of chronic leucemia. In the bone marrow studies, the erythroid elements are seen to be tremendously reduced, so that it is possible that the anemia is actually of long standing and had not been noticed by the parents. A better explanation of such a severe and sudden anemia would be an acute hemolytic crisis which is not unusual in cases of chronic lymphoid leucemia. The absence of reticulocytosis, elevated icterus index, and increased urinary urobilinogen are, however, against such an explanation.

Case 4. Uveitis

DR. JAMES CRAVENS.—This next case is that of a 9-year-old male who was admitted to Children's Hospital May 20, 1947. Except for one cold he had apparently been in good health all winter until April 18, when the mother first noticed that he had a mild inflammation of his left eye. There was red-

E. died postoperatively from signs and symptoms of hypoadrenalism, despite the fact that we were giving what we thought was adequate substitution therapy. I think when this child is sent to operation we ought to be sure to be well-prepared to give all types of supportive treatment for a while, to have special nurses in constant attendance, and have adrenal cortical hormones available, as well as adrenalin, salt, and glucose, to try to prevent the child from going into shock. In the literature, other deaths similar to E.'s have been reported following removal of a single adrenal gland with its tumor.

Addendum to Case 1

After presentation of this case at conference, an intravenous pyelogram was obtained which revealed apparently normal kidneys, but the left kidney was noted to be lower in position than usual. It was apparently displaced downward by pressure from above. The serum sodium preoperatively was found to be 142 millimols, potassium 14.8 mg. per cent, nonprotein nitrogen 26 mg. per cent, and the serum sodium chloride 562 mg. per cent. Serum glucose levels on several occasions were found to be normal. The twenty-four-hour excretion of sodium pregnandial glucuronidate was 14 mg., the 17 keto-steroid excretion was 45 mg. per twenty-four hours.

Laparotomy was performed through a long left rectus incision. Biopsies of skin and subcutaneous tissue in the muscle were taken, and a tumor of the left adrenal gland was removed. The right adrenal could not definitely be palpated. Neither ovary could be felt. Before, during, and after the operation the patient was maintained on large doses of desoxycorticosterone and continuous drip of 10 per cent glucose solution in saline. In addition, whole adrenal gland extract and later lipoadrenal extract were administered. The blood pressure remained considerably elevated (up to 165/105) for several days following the surgery. The postoperative course was relatively smooth. At no time did evidence of adrenal insufficiency (dehydration, hypotension, hypoglycemia) present themselves. The blood pressure gradually stabilized at a level of about 110/60. The serum true glucose was on all occasions within normal range. One week postoperatively the serum potassium was found to be 4.91 meq. (19.2 mg. per cent) and sodium was 138 meq. The nonprotein nitrogen had risen slightly to 34.5 mg. per cent. On the sixteenth hospital day lipoadrenal extract was discontinued, and no further substitution therapy has been given since. There is no evidence at the present time of adrenal insufficiency. The child is happy, playing well, and seems to be in perfectly good health. There has been no marked regression in the secondary sexual development so far.

The pathologist reported that the tumor which was removed was an ovoid mass measuring 6 × 4 × 3 cm. in diameter. It had a capsule, through which could be seen shining, yellowish-pink, tumor tissue. The capsule showed evidence of lobulations beneath the surface. On cut section the tumor bulged markedly above the edge of the capsule and showed a lobulated appearance, with both large lobules and smaller individual lobules within the larger ones. It had a variegated appearance as to color, some areas being bright yellow, others being duller yellow to gray. It was of firm consistency after being fixed.

was on or off. The remainder of the physical examination revealed several palpable, small posterior cervical lymph nodes and one epitrochlear node which appeared to be round, smooth, and nontender. The pharynx was clean; the left nostril was injected and contained a small amount of pus. There was no sinus tenderness. At one time yesterday, May 22, it was noted that the child had somewhat exaggerated involuntary motions when he was sitting in bed. We could not definitely ascertain if this was due to nervousness, but no such movements have been seen since. The remainder of the physical findings were all negative. The hemoglobin was 13.9 Gm. There were 9,500 white blood cells with 2 eosinophiles, 1 juvenile, 1 stab cell, 54 segmented cells, and 42 lymphocytes. The red blood cells on the smear appeared normal, and the only unusual finding was occasional toxic granulation of the polymorphonuclear cells. The platelets appeared adequate. Sedimentation rate (corrected) was .325 mm. per minute. Typhoid O agglutination was obtained in 1:40 and 1:80, and it was negative in 1:160. All other agglutinations including typhoid H, paratyphoid, *Salmonella schottmülleri, Brucella abortus,* and proteus OX19 were negative. In addition, the tuberculin and Wassermann tests have been repeated but are not yet ready for report. The histoplasmin skin test is also being done at this time. We are obtaining x-ray of the chest, sinuses, and teeth.

DR. THEODORE SANDERS.—I believe this child is interesting from two points of view. The first one is the incidence of this disease in children, and the second one is the etiology. As far as the diagnosis goes, the ophthalmologists have a very great advantage because we have an organ we can look at, and our diagnosis is very often purely descriptive. In addition to the findings mentioned one can, with a slit lamp, see that on the endothelium there are a number of small keratitic precipitates which are agglutinations of white cells. The aqueous is cloudy. The vitreous is almost completely hazy, and with the ophthalmoscope a large number of stringy floaters which are agglutinations of white cells can be seen. I thought that I could see a white mass in the inferior part of the retina which might be a large area of choroiditis. I could not be sure of that at all.

Uveitis, of course, means an inflammation of the uveal tract, the uveal tract being the vascular coat of the eye—the iris, the ciliary body and the choroid. Anterior uveitis or iridocyclitis, in which the symptoms are chiefly in the anterior segment, can occur. There can also be a posterior choroiditis, or posterior uveitis and choroiditis. This case, I believe, is of the latter type. I believe that this is uveitis, but that most of the inflammatory process is in the posterior segment, which accounts for the marked loss of vision and the cloudy vitreous. Since the uveal tract is almost completely vascular, we believe that most uveal diseases are secondary to systemic diseases elsewhere. Search for an etiologic factor in these cases is usually futile. I don't think that the pediatrician appreciates this quite as much as the internist because of the rarity of these cases in children. Sometimes in the milder cases, we feel that it isn't even worth while to go through an intensive survey of the patient. The obvious etiologic factors, of course, are the chronic granulomatous types of inflammation, tuber-

one high in protein, high in carbohydrate, and low in fat. The baby was given supportive treatment with plasma and glucose intravenously and Ringer's subcutaneously to maintain hydration. The temperature remained for the most part between 38 and 39° C., but on the second hospital day spiked to about 40° C. This was quickly controlled by temperature sponges. X-rays of the long bones and skull revealed healing or healed nutritional disturbances of the bones. There was effusion into both knee joints and a small area of radiolucency projecting into both parietal and frontal bones, the right scapula and both femurs. The lesions in both femurs, the scapula, and skull, suggested either a chronic pyogenic or luetic osteomyelitis or a tumor of the lymphohematopoietic system, such as a chloroma or leucemic infiltration.

One of the cervical nodes was biopsied, and the microscopic section revealed infestation with histoplasma capsulatum. Previous to this, a bone marrow sample had been secured, and some yeastlike particles were seen, both intracellularly and extracellularly. These were considered to be suggestive of histoplasma organisms. A histoplasmin skin test was done on the fifth hospital day, but the child expired on the sixth hospital day before the skin test could be read. Studies done at the time of admission showed prothrombin time, clotting time, and bleeding time within normal limits. Serum nonprotein nitrogen, protein, calcium, phosphorus, carbon dioxide, and chloride were also normal. Blood sugar was 25 mg. per cent. Culture of the gastric juice revealed abundant growth of colon bacillus. There was normal tryptic activity of the duodenal juice, and the cephalin cholesterol flocculation test was reported as 3 plus. Several blood, urine, and stool cultures did not reveal any significant organisms, and routine agglutinations were negative. Clinical diagnoses were: histoplasmosis, generalized; malnutrition, severe.

DR. OSCAR RAMBO (Pathologist).—At autopsy we found the emaciation and dehydration as noted in the physical examination, and in addition there was an ulcerated area which had slightly raised edges covered by a greenish exudate in the skin over the left posterior lumbar region. On examination of the internal structures, significant findings were in the gastrointestinal tract. In dissecting the neck organs we found ulcerations at the lateral margins of the tongue. These ulcers were pink in color, and the edges were granular and slightly elevated. In the cervical region were numerous enlarged, yellowish nodes which were clustered about the submaxillary glands. There were fewer of these nodes about the upper part of the trachea. In the mediastinum we found no similar lesions. In the abdominal cavity we found great numbers of huge nodes in the mesentery of the entire intestine. The peritoneal cavity contained 25 c.c. of dark yellow fluid. In the solid viscera the only granulomatous lesions noticed were nodules of yellowish color with areas of caseation in both adrenal glands. In the intestine the changes were most notable in the jejunum. The first change consisted of very fine yellowish-brown areas in the villi which appeared grossly to be distended firm lacteals. In the ileum we found a few similar areas. Most notable were numerous ulcerated lesions which were round or ovoid, the ovoid ones having their greatest diameter perpendicular to the long

inflammation somewhere. In such a case the antibiotics may help, not by affecting the eye lesion directly but by curing the obscure infection.

DR. RUSSELL BLATTNER.—This condition is very rare. However, in February, 1941, we saw two children, brother and sister, 6 and 8 years of age, who had had mild chickenpox five weeks before. Both children recovered from this illness without complication and returned to school. About two weeks later the entire family, eleven in all, developed "flu." One week later both children developed photophobia, mild conjunctivitis, pain in the eyes, and gradual loss of vision. The children were brought to Children's Hospital. Severe bilateral uveitis was the diagnosis in both cases. Neither child appeared ill. The ophthalmologist, Dr. Scobee, concurred in the diagnosis. He performed bilateral paracenteses of the anterior chambers in each case. This material was inoculated on the chorioallantoic membrane of the fertile egg. Dr. Heys and I attempted to grow a virus or bacteria from this material but did not succeed. In addition to the surgical treatment, fever therapy was tried (Kettering hypertherm). It was the impression of the house staff that the local manifestations of uveitis were less marked, but vision was not improved. The girl was completely blind at the time of discharge. The boy gradually regained some vision, so that he could recognize objects across the room, and eventually recovered vision in the left eye, but vision in the right eye did not improve. Eighteen months later the boy developed a "cold." Signs and symptoms of uveitis recurred in the good eye. The patient was readmitted to the hospital. Because of chronic tonsillitis and maxillary sinusitis, tonsillectomy and adenoidectomy and antral washings were performed. Within a few days after this operation, vision in the left eye improved. The girl remained completely blind. We have not seen either of these children since the time of the second hospital admission.

DR. SANDERS.—A couple of months ago we showed five cases here: one of them was listed as iritis. You may remember, Dr. Blattner, that that patient had an herpetic ulcer with secondary iritis in which the iritis was probably herpetic, so that I should think it would fall in the same class as these. I think that the fact that virus was not recovered from the aqueous does not necessarily mean that there was no virus in the anterior uveal tract. I think Dr. Blattner's statement that the eye got better after tonsillectomy and again after hypertherm therapy illustrates one of our greatest difficulties in evaluating the etiology of the condition. Most of these cases improve if enough time elapses, no matter what therapy is instituted.

Case 5. Tracheo-esophageal Fistula

DR. JAMES COOPER.—The next patient is a 23-day-old infant admitted at the age of four days, with the diagnosis of tracheo-esophageal fistula. Instillation of small amounts of lipiodol into the upper esophagus revealed evidence of complete esophageal obstruction at the level of the manubrium sterni. The abdomen at the time was filled with air, so it could be assumed that a fistula was present. The infant was of premature size (2,340 Gm.), slightly dehydrated,



Fig. 1.



Fig. 2.

Fig. 1.—Giant cell containing the organism *Histoplasma capsulatum.*
Fig. 2.—Ulcer of colon.



Fig. 3.

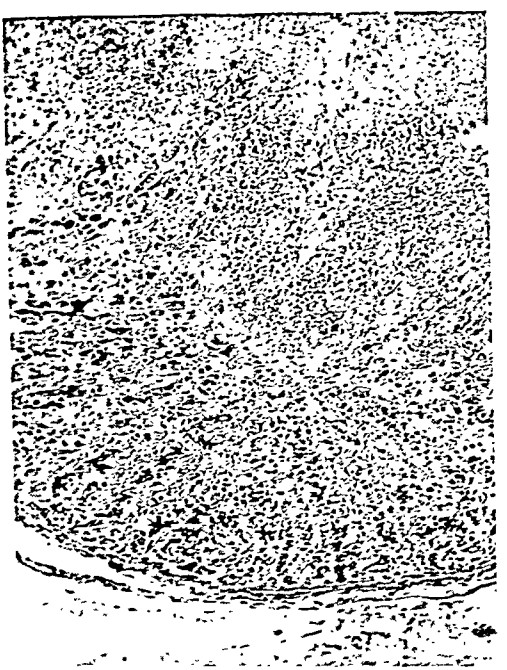


Fig. 4.

Fig. 3.—Intestinal villi showing infiltration of large mononuclear cells and multinuclear giant cells containing organisms.
Fig. 4.—Large area of caseous necrosis in the adrenal gland.

blind pouch. The portion between the two ends of the esophagus may be connected by small fibrous or muscular bands, or there may be no connection at all. The distance between these two segments may be quite wide (several centimeters), or it may be very narrow. In this type the fistulous tract usually runs from the lower segment of the esophagus directly into the trachea. More rarely it may connect to one or the other main bronchi, and more rarely still there may be a fistulous tract running from the upper portion of the esophagus to the trachea or to one of the main bronchi.

The clinical picture that is presented by these infants is as a rule quite characteristic, so that the diagnosis is easily established. Usually they are born in a normal manner, and examination of the infant immediately after birth reveals no evidence of abnormality. It is only after the first few hours in the nursery that one begins to suspect trouble. Initially, the nurse will comment on the fact that the child has a large amount of mucus in his throat, that she continually has to suction it out. He breathes noisily and occasionally will choke and cough, so that very frequently the infant's nurse will be the first to suspect the diagnosis. At the time the child is fed, the characteristic symptomatology appears with the first few swallows of water. The child does well, but as the feeding continues, he will regurgitate the fluid, and it may be aspirated, producing choking, cyanosis, and sometimes unconsciousness for a period. Suction and oxygen administration must be used to revive him. Abdominal distension, which is unusual in a child this age, is often striking. The distension is usually in the upper portion of the abdomen, and on fluoroscopy most of the air is seen in the stomach, whereas the lower portion of the abdomen and the intestinal tract is not filled with air during this early period. The regurgitated material does not contain bile. The meconium that is passed by these children is characteristic in that it contains no epithelial cells in keeping with the findings obtained in atresia anywhere in the gastrointestinal tract. The diagnosis suggested by these clinical observations can easily be confirmed by the use of a catheter which is passed into the esophagus and which is seen to progress to the end of the blind sac and then curl back up. If one wishes to employ opaque material, lipiodol should be used rather than barium, since any material put into the upper pouch of the esophagus invariably will be regurgitated into the pharynx, and a portion of it will be immediately aspirated. Barium is extremely irritating to the lungs and initiates a fulminating pneumonia.

In the medical treatment of these patients one is primarily concerned with the prevention or treatment of pneumonia which develops as a result both of aspiration of the regurgitated contents of the esophagus and as a result of regurgitation of the stomach contents directly into the bronchial tree through the fistulous tract. Prevention of pneumonia is best accomplished by early surgery, by omitting oral feedings after diagnosis has been established, and by not using irritating opaque media in the esophagus. The other point that is of extreme importance in the medical management is the establishment and maintenance of optimum nutrition. If surgery can be instituted early, nutrition usually can be well maintained by feeding through a gastrostomy opening.

in cases with some type of chronic disease such as bronchiectasis or chronic urinary infection. We did have quite a number of positives on surgical ward, but we don't have chest films on all these patients. We are still in the process of trying to correlate x-rays and clinical findings.

DR. MARTZ.—Dr. Lynch, is there any correlation between the presence of allergy, such as asthma or allergic rhinitis and eczema, and the positive tests?

DR. LYNCH.—As far as I know, there is none. I think we have had two cases of asthma with positive histoplasmin tests. There were no cases of eczema.

DR. SMITH.—Have you made any attempt to find out where these particular children have lived—whether in the country, city, or in Missouri or elsewhere?

DR. LYNCH.—We haven't done that yet.

DR. LOGAN MEWHINNEY.—Dr. Little has some x-ray films on this child.

DR. JAMES LITTLE.—The most striking findings in the x-rays are in the skull films. I think even from a distance you can see these moth-eaten areas throughout the frontal and parietal regions. They show up in all the skull films. The first thing that we thought of was a luetic process. We couldn't find any reference to this type of lesion occurring in histoplasmosis so that it will be interesting to watch from now on to see if we can find this type of lesion in other cases of histoplasmosis. As far as the clavicles were concerned, our film did not show much, but there are areas here in the right scapula which are suspicious.

The long bones showed some changes, and you can also see the marked thickening of the periosteum on the shaft of the femur and some of the destructive radiolucent areas in the bone adjacent to that periosteal reaction. I do not know if there is effusion into the knee joint. The apparent presence of fluid might be illusory due to wasting of the tissues above and below the knee. There is flaring of the epiphyseal portion of the bone, radiolucency, and marked thickening of the periosteum on the inner aspect of both tibias which suggested possible previous deficiency disease which had healed or was in a healing state.

Case 3. Chronic Lymphatic Leucemia

DR. RICHARD HAWKINS.—The next case is that of S. J. T. who is now 3½ years of age. She entered the hospital four days ago. This is her third hospital admission. The first admission was from Feb. 12, 1946, to Feb. 25, 1946. At that time she entered with the chief complaint of pallor. There was a history that at the age of 5 weeks she was noted to have an enlarged spleen and anemia. She was, however, asymptomatic. No treatment of any sort was given at that time. She was seen by a physician the next time at the age of 5 months. At that time she had an enlarged spleen, enlarged cervical

the right amount of minerals in a balanced form, some 3 to 5 Gm. of protein or potential protein per kilogram per day, and possibly 10 to 12 Gm. glucose per kilogram per day, and all of the fat-soluble and water-soluble vitamins known. From a quantitative point of view, however, except perhaps for a few days when dehydration is present, which would allow for an unusual water administration, we could scarcely get beyond half of the desired caloric intake, and we would wind up with about 50 or 60 calories per kilogram body weight unless we gave so much fluid to get further calories in that it caused water-logging. Today, Dr. Rutledge has some fat emulsified by a new principle, a principle which attempts to avoid the toxicity of lecithin which previously has been used as the emulsifying agent and which has been a stumbling block in that it is difficult to procure and in that lecithin is toxic and deteriorates rapidly. With this fat emulsion, which, it seems, can be administered without reaction, it ought not to be difficult to add another 30 or 40 calories per kilogram of body weight per day, so that we ought to be able to get up to about 80 calories per kilogram and perhaps even to 100 without the risk of water-logging. Perhaps at a subsequent conference when the occasion permits, we can work this out on the blackboard to demonstrate the details of parenteral alimentation.

DR. ROBERT RUTLEDGE.—This emulsion consists of 10 per cent fat. It does not require any complicated apparatus (it is made in an electric cocktail mixer), and it does not break down after it is autoclaved.

DR. BLATTNER.—What is the globule size, Dr. Rutledge, compared with regular milk, homogenized milk, and breast milk?

DR. RUTLEDGE.—By comparing roughly the particles of the emulsion with red cells, it is about one-half the diameter of the red cell (3 to 4 microns). Those are the largest sized particles; then there are a great many particles much smaller, and some almost submicroscopic which can be seen as a little occasional flash of light in the dark field. It is interesting that the chyle from the cases of chylothorax has particles in it that are sometimes as large as 15 to 20 microns in diameter, and yet it does not seem to cause a lot of trouble.

DR. HARTMANN.—Several times the diameter of red cells.

DR. RUTLEDGE.—That is a very interesting point, because while many emulsions have been made with extremely small particle sizes in large, high-pressure, homogenizing machines, they always seem to get stuck up in the lung, in the liver, and in the reticulo-endothelial system. Red cells and large white cells seem to slide through capillaries without any trouble, and this makes one surmise that the important thing is not the size of the particle but its chemical and physical properties.

DR. HARTMANN.—I meant to mention before that as a basic feeding for this second child we should give about twice daily, therefore about every twelve hours, 50 c.c. per kilogram body weight of the D.A.S.* solution which we have

*Dextrose 10 per cent, Amigen 10 per cent, and special salt mixture in equal parts.

tinued for two days, and four days before admission she developed a fever which ranged between 103° and 104° F. She was seen by a physician who told the parents she was probably developing measles since there was measles in the neighborhood at that time. On the following day, however, the temperature was still elevated, and there were no symptoms or signs of measles. She was seen by another physician who said she had an otitis and prescribed a chocolate medicine and ear drops. On this treatment her fever continued and on the day prior to admission she began to have generalized convulsions which lasted for several hours but abated on treatment by the family physician who again referred her to Children's Hospital. On admission she was extremely pale, but in little distress. It was hard to believe that this anemia had come on as suddenly as the history seemed to indicate. The spleen now was at the level of the umbilicus, whereas previously it had been felt at the level of the pelvic brim. The liver was still enlarged about 1 to 2 fingerbreadths below the right costal margin.

Laboratory examination on this admission revealed normal urine. The red blood cell count was 1.28 million; hemoglobin, 3.5 Gm.; white blood cells, 66,700. The differential was similar to previous differentials in that there were 84 lymphocytes and 16 granulocytes. The lymphocytes were of the small, mature type. Platelet count at this time was 626,000 per c.mm. The hematocrit was ten on this admission. No reticulocytes were seen. The indices revealed anemia of a slightly hypochromic microcytic character. A bone marrow examination was done yesterday. The results are shown in the chart. Previous bone marrow examination done in this hospital on the first admission showed a large number of lymphocytes, mostly of the small type. The normoblasts were 7, early erythroblasts 1, late erythroblasts 6, giving a total of 14 red blood cells per 100 white blood cells. In contrast, on this admission the bone marrow showed 60 lymphocytes, 23 stab cells, 5 polymorphonuclears, 7 myelocytes, and 3 metamyelocytes. Erythroblasts on this admission were 1 per 200 white blood cells. They were very rare. Other laboratory data was reported as follows: the icterus index was 6, and the quantitative urine urobilinogen was .46 Ehrlich units for two hours, which is within normal limits. The patient has received two transfusions on this admission. The first transfusion brought the hemoglobin up to 9 Gm.; she received another full transfusion yesterday.

DR. JEAN HOLOWACH.—This patient is presented this morning as a diagnostic problem. Several points should be clarified before the discussion. It was mentioned that at 5 months of age the hemoglobin was 10 Gm. after a blood transfusion. Dr. Hawkins, are you sure that she was transfused at that time? It is my impression that she was not. The average hemoglobin at that age is approximately 11 Gm., so that she really had not shown any unusual anemia prior to her present illness. Her first red blood count at Children's Hospital of 2.85 million also bears comment. A count done the day before was 4,300,000. The differential white blood count with 88 per cent lymphoblasts is certainly open to question. All previous and subsequent smears showed only

will certainly crop up, and I think it would be worth while to make your basic procedure utilize subcutaneous administration for most of the water that you are going to have to give, so that you can save veins for the things, that must be given intravenously, such as fat.

DR. LAWLER.—Can fat emulsion be picked up from the peritoneum?

DR. RUTLEDGE.—We have not done very much about that.

DR. HARTMANN.—That is certainly something that has to be thought of later, whether subcutaneous and peritoneal administration can be utilized. These might be successful. It is amazing what is picked up from the peritoneum. Actual intact red cells get through and into the circulation. It is possible to inject avian blood with nucleated corpuscles intraperitoneally and find these cells almost immediately in the general circulation.

REFERENCES

1. Pratt, J. P., and Shaefer, Robert L.: Sex Precocity, Virilism, Adrenal Cortical Tumors, Am. J. Obst. & Gynec. 49: 623-633, 1945.
2. Novak, E.: The Constitutional Type of Female Precocious Puberty With a Report of Nine Cases, Am. J. Obst. & Gynec. 47: 20-42, 1944.

ness of the conjunctiva but he had no photophobia, lacrimation, or other complaints. There had been no previous injury to the eye, although approximately one week before the redness was noted the child had struck the left side of his forehead against an open storm window. This had caused a small bruise, but apparently the window had not struck the eye. Boric acid washes were applied to the eye for approximately one week with some improvement. On April 25, the mother noted that the left pupil was somewhat dilated. Three days later the patient was taken to an ophthalmologist, and treatment was begun. In the meantime a Wassermann, complete blood count, urinalysis, and tuberculin skin tests were all found to be normal. Several types of eye drops were applied, and the child was treated with hot applications and with three subcutaneous injections (substance unknown). During the first week of treatment he was free of subjective symptoms but three weeks ago noticed that vision in the left eye had failed. The only other symptoms present during this period were two mild headaches which the mother attributed to hunger, and a temperature elevation of 100° F. which occurred after a subcutaneous injection.

The past history of this case offers little relevant information. He was a full-term infant, delivered by instruments. There was no injury except for one small forceps mark on the head. The infant was breast fed for one month, then fed evaporated milk feedings, and later whole milk. He had chickenpox, measles, pertussis, and several attacks of otitis media and tonsillitis during the second year. When he was 3 years old his tonsils and adenoids were removed. Since that time he has had infrequent colds, and during the past six months has had only one cold, possibly a mild case of influenza which was followed by some nasal discharge from the right nostril for two or three weeks. He has been immunized against smallpox and diphtheria. He has had no contact with any contagious diseases. There is a history of a brief questionable exposure to tuberculosis. There are two siblings who are in good health. The father is in the Army in Japan at the present time and has been in good health except that he once had what the mother believes was retinitis. This was cured, and he has had no further ocular symptoms.

On admission to this hospital, the patient did not appear acutely ill. Abnormal findings were virtually limited to the eyes. On the right the pupil was round and regular and responded rapidly to light and accommodation. I could see nothing pathologic in the anterior chamber. The posterior chamber was clear, and the retina was well visualized. The disk and vessels appeared quite normal. On the left, the eyelid appeared puffy and there was some conjunctivitis and chemosis. The tension of the eyeball seemed slightly reduced to most examiners. The pupil was widely dilated and did not react either to light or accommodation. The cornea, the pupil, and anterior chamber, however, appeared quite clear. On ophthalmoscopic examination one could not get through to visualize the retina. There was a tannish-red cloudy medium throughout which appeared to be the vitreous, and in one portion of this I could see approximately ten or twenty pinpoint black bodies. The child is virtually sightless in this eye and could only tell me whether the ophthalmoscopic light

Diseases, 1940; Treatment of the Patient Past Fifty, 1941 (2nd edition 1944). Writer on diseases of heart and chronic disease as a community problem.

Address 1185 Park Avenue, New York, New York.

I might add that Dr. Boas is the son of the famous anthropologist, Dr. Franz Boas of Columbia University.

E. A. P.

AN OPEN LETTER TO DR. PALMA:

I have read Mr. Milliman's* intelligent (and adverse) criticisms of compulsory prepaid medical care as proposed in the Wagner-Murray-Dingell Bill S.1606. I have read Dr. Ernst P. Boas' equally intelligent reply to it.† And now I have read your reply to Dr. Boas, which you have sent to the state chairmen of the Academy. In this open letter to you, I am sure you will understand that although I am State Co-Chairman for Missouri, my comments on your statement represent my own opinions and *not* those of any of the Missouri Fellows.

Freedom of speech and press is part of true Americanism, an opinion which I am sure Dr. E. A. Park, who conducts the JOURNAL'S column on the "Social Aspects of Medicine," shares with both you and me. I have no doubt that he will publish your statement and possibly various comments thereupon.

I had hoped that your statement would continue the cool, scientific attitude of the two communications which evoked or provoked it. But your request for "documentary evidence of who they (writers on this subject) are and whom they front for," and your "specious arguments advanced by Dr. Boas and others of like ilk of the professional do-gooders and fellow travelers," suggest a reaction of hyperpyrexia on your part. And so it is with many physicians, so volubly and expensively represented by the National Physicians' Committee for the Extension of Medical Services, crying "Come weal, come woe, my status is quo!"‡

Here, Dr. Palma, is the gist of the matter: Are you correct in saying that American medicine is the best the world has produced under any system? Some (not all) of the New Zealanders, Danes, and Swedes would voice firm and documented disagreement. More important, let me quote one, perhaps omitted from your list of heroes, Franklin Roosevelt:§

> "We have reason to derive great satisfaction from the increase in the average length of life in our country and from the improvement in the average levels of health and well-being. Yet these improvements in the averages are cold comfort to the millions of our people whose security in health and survival is still as limited as was that of the nation as a whole fifty years ago."

For my part, I am convinced, as are you, that a third party should not intrude *medically* between doctor and patient. But spreading the cost of medical care by the insurance method need not involve this. If machine politics cannot be kept out of medicine, then woe betide doctor and patient! The current version of the Wagner-Murray Dingell bill endeavors, by decentralization, to avert such political control. At present, on this matter of "means-to-a-better-end," I am in the position of a confused liberal, and have so told my class in professional conduct and economics.

But it must be clear to all not overcome by Red-baiting fever (Rubrophobia?) that American medicine produces remarkably well what it distributes amazingly ill. Only insurance can properly help our patients pay for this expensive essential. And only *more* physicians, more of the despised do-gooders, can purvey the best medical care to those who need it most and have it least.

(Signed) PARK J. WHITE, M.D.
St. Louis, Mo.

---

*Milliman, W. A., J. PEDIAT. 29: 527, 1946.
†Boas, Ernst P., J. PEDIAT. 30: 478, 1947.
‡Quote seen in the *Atlantic Monthly* some years ago.
§Message on Health Security, July, 1938.

culosis, syphilis, leprosy in some areas, sarcoid, and the like. I feel that in this country foci of infection are probably the chief cause. The mechanism of eye tuberculosis, I believe, is a hypersensitivity reaction and not a real tuberculosis with the tubercle in the eye. In other words, the child has childhood tuberculosis, and he develops an altered reactivity to the tubercle bacillus. Later, on further exposure, the vascular coat of his eye flares up. This probably happens seldom before adult life I think one other factor must be considered here. A very small lesion in the choroid will produce a tremendous loss of vision, a physiologic loss which the patient notes as a very marked symptom. He will come to the ophthalmologist for a very tiny lesion in his choroid whereas if he had a similar lesion in a joint or in the cardiac muscle or elsewhere he would never know he had it. I think we see many minor lesions which would be passed up elsewhere. I think the slow evolution of the process accounts for the fact that we do not see much childhood tuberculosis of the eye. Syphilis of the eye shows up as keratitis I believe that there is a very definite anterior uveitis associated with the keratitis. Possibly the anterior uveitis is the primary thing, and interstitial keratitis is only secondary to that. The interstitial keratitis is so much more obvious than the anterior uveitis that it is the usual clinical manifestation. It is difficult to incriminate foci of infection in any particular case of iritis We can pull a man's teeth or we can take out his tonsils, and if he gets well that doesn't mean that we have eliminated the actual cause of the disease. I think that until we know more about this condition we're going to be up against a stone wall It is important to try to discover the mechanism by which a focus of infection causes uveitis. Is it a septic embolus? I don't think so Is it a bacterial allergy? Possibly. Is it some mechanism that we don't know much about, such as the Shwartzman phenomenon? Perhaps there is some unknown mechanism by which focal infection can cause a vascular tissue to become inflamed.

This brings us to a discussion of the management of these cases. Of course, the first thing we try to do is to eliminate the etiologic factor. This is actually the internist's, the dentist's, and the nose and throat man's job. As far as foci of infection go, I think teeth, sinuses, tonsils, and, in the adult male, the prostate are common sites. The gastrointestinal tract, I think, is less common, and there are probably other more obscure sites. The local treatment is important particularly in the anterior cases. Atropine is used to dilate the pupil. I think that is about the only local treatment that has any effect at all. Hot compresses may make the eye feel better, it is doubtful that they lessen inflammation. Foreign protein therapy, such as typhoid vaccine, constitutes the best treatment in the majority of cases. I think you all are aware that we do not know all that happens when typhoid vaccine is injected into an individual, but the response to typhoid in some of these cases is dramatic. I suspect that this boy will be getting foreign protein therapy before long. There's one thing here that might give us some hint as to the etiology in this case. This child has run a low grade fever, he has a slight leucocytosis; I suspect that he has a chronic

with the Medical Director (a physician) and the Chief of Staff on all administrative problems relative to the practice of medicine. The Service Contracts, Staff Contract, and Staff Organization are outlined below.

The Group Health Cooperative is in principle and practice a democratic nonprofit, medical service organization.

Services are provided for the entire family on a dues paying basis. An abstract of the service agreement is as follows.

1. Medical and surgical care in the home, hospital or office, including preventive measures
2. Diagnostic x ray examinations of all kinds, including dental
3. Physical therapy as prescribed by the physicians
4. Laboratory tests and procedures as indicated by the physicians
5. Drugs, medicines, and surgical supplies as prescribed, except orthopedic or corrective devices, prostheses visual aids, vitamins, hormones, blood plasma, radium or deep x ray therapy
6. Prophylaxes against those diseases which are preventable by appropriate inoculation
7. Dental care is not at present provided, but is projected.
8. Emergency care up to $50.00, including ambulance service when necessary.
9. Hospital care in ward beds, unless ordered otherwise by the physician (except cases subject to quarantine regulations) up to 180 days for each illness. Special nursing is available when ordered by the attending physician.
10. Exclusions: cases covered by Federal or State law, insanity, tuberculosis, venereal diseases, mental disorders, alcoholism, drug addiction, attempted suicide. Pre existing conditions noted in the contract, obstetric care within ten months of membership, tonsillectomy within six months, and surgery other than emergency within three months are cared for on a cost basis where the member is in good standing. The Cooperative will diagnose the conditions and will treat venereal disease in the acute infectious stages.
11. Members and their dependents will comply with all the recommendations of the attending physicians and "failure to do so shall automatically terminate all rights to any further services and benefits hereunder."

This is believed to be one of the most inclusive medical care programs in the country, assuring the family complete coverage, for all members, for the vast majority of their ills on a self supporting, budgeted basis. The current dues are $3.00 per month per adult and $1.50 per child per month, the first two children only being charged. In order to receive service after the age of 65, a member must have held a continuous membership for five years.

Dues of $108.00 per year for a family of four is not beyond the reach of a working family in this area of high wages and high living costs, when one considers that the coverage is complete with no additional cost for medicines, fees for "first visits" or the other numerous extra charges found in many contracts. Many wage earners find that over a period of years their average annual medical costs have been considerably higher, and it is difficult for some to believe that they are not going to receive a "cut rate" type of care. The dues are, however, above the means of the indigent, the unemployable, or the old age pensioner. Some form of Federal or State aid is necessary for their care. The standards and organization of the Group Health Cooperative would be adaptable to a State aid program on a contract basis. The clerical load could be centralized and the medical care supervised by the Medical Director and Chief of Staff. As Dr. Boas has recently pointed out in this column (30: 481), "It has become a truism that the best medical care is given by physicians cooperating in a well knit group, the services of the group being purchased not by a fee paid for every service but by a prepayment plan."

The Medical Staff is composed of general practitioners and specialists, working under the direction of the chief of staff elected by the members of the staff and agreed to by the board of trustees of the Cooperative. The staff works on a contract with the Cooperative, which is abstracted as follows:

1. The Cooperative recognizes the staff as bargaining agency for its members, and will entrust to the staff all matters of maintenance of standards and the regulation of medical

but with no evidence of infection. He was hydrated and placed on antibiotics, and the fistula was operated upon the following day. Two days following the repair of the fistula gastrostomy was done, and feedings were started via the gastrostomy tube. The postoperative course was uneventful except for periodic episodes of cyanosis until six days ago, when the child developed diarrhea on his thirteenth hospital day. Culture of the stomach contents at that time grew staphylococcus, diphtheroids, and *Escherichia coli*. The therapy of the diarrhea has been routine, and the diarrhea has not been too severe. At the present time diarrhea is abating, and the baby's condition is improving. The weight at present is 2,870 Gm. We have passed a ureteral catheter through the nostril into the stomach without any difficulty and then, in a retrograde fashion, established a gold-impregnated string in the esophagus for later dilatation.

Case 6. Tracheo-esophageal Fistula

DR. WILLIAM DAVIS.—*This newborn infant entered the hospital* May 20, 1947, at the age of 28 hours. The history of the pregnancy and delivery was not remarkable. In the nursery, it was noted that the baby became cyanotic and had a rattling respiration. This was relieved by frequent suction. The material suctioned at first was a light amber color not unlike amniotic fluid, and later it became clear and mucoid. Attempts to feed the baby glucose water on several occasions aggravated respiration and caused a great deal of distress. The water appeared to be regurgitated. Physical examination in this hospital revealed a well-developed 3,500 Gm. newborn infant with loud audible rhonchi heard without the stethoscope; the color was good and there was a good Moro reflex. There were a few moist râles at the bases of the lungs. Under fluoroscopy, an attempt was made to pass a tube into the stomach. At about the level of the cricopharyngeus muscle the catheter turned on itself, curled back, and passage beyond that point could not be made. There was some air in the stomach, but attempts to force this air up into the esophagus to visualize its distal segment failed. An attempt at operative repair of the fistula was unsuccessful. Postoperatively, the baby has been maintained on continuous intravenous alimentation in which a fat emulsion prepared by Dr. Rutledge is being utilized.

DR. MERL CARSON.—The condition of tracheo-esophageal fistula is one that we see rather infrequently here, and very fortunately. Several types of fistulas have been described, so that it might be wise to enumerate these very briefly. In one type the esophagus and trachea are both patent but are connected by a small fistulous tract. In a second type there is real atresia of the esophagus with no fistulous communication between the esophagus and trachea. The third type, which constitutes 75 to 80 per cent of the cases, is the type present in this child. There is a blind upper segment of the esophagus which is usually dilated and which extends down as a rule to the level of the fourth thoracic vertebra; extending upward from the stomach is the distal segment of the esophagus which narrows as it progresses upward and also ends in a

The rights of the staff are fully protected. There is no interference in the practice of medicine nor in the patient physician relationship, no layman makes any profit out of the labor of the physician, and the medical affairs are managed entirely by the staff of physicians and the medical director (also a physician) who is the liaison between the staff and the board. It has been stated repeatedly that a contract practice is discouraging or at least not conducive to continued study and development of the physician. This is without foundation There is no stimulus more strong than the pride in and pressure of a group of physicians working as closely together as such a staff must work The work of any individual is under the constant scrutiny of his fellows, and the standards are those of the best of the group rather than of one individual working in an isolated office

The Philosophy of Group Practice is constantly emphasized, in that no man is required to care for those conditions for which he is not specifically trained, that the individual physician is part of the team, that the best interest of the patient is served only if the best care is provided by the whole group, and that the responsibility for the care of the family is a joint responsibility Duplication of tests and x rays is eliminated, and there is a continuous record on the patient containing all the information collected over the entire period of the individual member's service The advantages of group practice to the physician and the patient are well recognized and need no further comment When a condition arises for which the staff members are not competent to treat, the patient is referred to a local specialist, and the bill is paid by the clinic

The application of group practice within the structure of a Group Health Cooperative results in many additional gains for physician and patient The democratic participation of both members and staff stimulates mutual faith and understanding The fact that the venture is a joint one in which both have high stakes tends to limit abuse on either side These intangible advantages remove the elements of fear of the physician, distrust of procedures, and much of the anxiety relative to medical insecurity

The patient physician relationship is closer than in many other situations The sixteen physicians in the present group are spoken of as "our doctors" by the members and are known to the entire family When a new crisis arises, the specialist comes to the patient as an old friend of the family rather than someone "called in" for the occasion. The staff member is part of a medical family, just as the patient is part of a domestic unit. Free choice of physician is exercised by choice of the group, since membership is voluntary, but the staff is sufficiently large to permit leeway for individual tastes and preferences Since a high value is placed on the general practitioner he frequently becomes the preferred member and refers to specialization such problems as are of an appropriate nature This leaves the specialist free to concentrate more closely on his specialty

In such an organization, the control and financial burden are spread so widely throughout the membership, and the lines of authority and management are so democratic, that no special interests or groups can exert undue influence The practice of medicine is placed on an ideal plane, free from economic, social or political pressures, so that the personal and scientific aspects are left paramount The patient is cared for purely on the basis of the best medical judgment in the individual case

The nonprofit aspect of the Cooperative assures the patient of maximum service for his fee and an adequate return for his money Too large a profit over a period of time would result in lowered rates, removal of exclusions, or increased services in other fields. The removal of the profit element represents a great social advance

The close contact with members and the absence of economic barriers to care provide an ideal basis for a fully applied preventive medicine program for the entire family. This is particularly valuable to the pediatrician who can, through immunization, periodic physical and psychological inventory, and knowledge of other illnesses and crises in the family, guide the parents toward better child management Family problems are dealt with on a staff basis, which is of inestimable value to the pediatrician.

The physician has complete freedom of function within the limits of good medicine Opportunity for research, postgraduate training, rest, relaxation, and "the good life" are

DR. THOMAS BURFORD.—Surgery of esophageal atresia and tracheo-esophageal fistulas has intrigued pediatric surgeons for a long time. Formerly, an occasional patient was salvaged by the long hard method of swinging out a proximal flap of the esophagus into the neck and then doing reconstructive tube procedures connecting this proximal loop of the esophagus with the stomach. The procedure was not a good one, and the number of patients who had the good fortune and the number of surgeons who had the fortitude to pull through the long procedure that was necessary were few indeed. In 1933, Dr. Cameron Haight was able to report the first successful end-to-end anastomosis in a case which was of the more common type with a blind proximal loop and a distal loop connected to the trachea. It is fortunate that that is the form usually seen, since there is very little that can be done to or for the other types. It is a simple enough matter, however, to do an anastomosis between the blind proximal loop and the freed distal segment. The failures will result from there being too much tension on the suture line. That will stem from too much separation initially between the two loops. It is significant, I think, that we have learned to operate on these people. We have had four cases and four operative survivals. Unfortunately, we have encountered two in this group for which nothing could be done. They were not of the type amenable to surgery. The last baby shown today (Case 6) had a complicated dual tracheo-esophageal fistula with a long atretic segment between the proximal and distal ends of the esophagus. There was no possibility of bringing the two ends together for an anastomosis. Two of the cases have been of the type which can be repaired. In the first case the ends were rather widely separated, and the suture line broke down. The child died of complications of the esophageal disruption. The other case (Case 5) was ideal in that it was of the common type, and the proximal and distal loops were close enough to allow an end-to-end suture without too much tension on the suture line.

I return to emphasize that we do know how to operate on these children, and I think whenever the proper anatomic situation is found at operation, we should get a good result by performing an end-to-end anastomosis. Some, such as this child (Case 5), will require subsequent dilatations, but in the experience of Ladd and Swenson, who have now had some seventeen or eighteen patients, they dilate readily and apparently require few subsequent dilatations because the stricture which develops is very narrow.

DR. ALEXIS HARTMANN.—It is too late in the morning to go into the details of parenteral feeding. I merely want to restate what the problem is and about where we are in its solution. Prior to this conference, whenever we presented this problem we tried to solve it without consideration of the possibility of administering fat, and we always concluded as follows: we should be *able* to give complete parenteral feeding from a qualitative standpoint without too much difficulty with the use of Amigen, dextrose, plasma (especially enriched plasma), vitamins, and properly chosen salts. We should be able to supply the right amount of water which might be about 200 c.c. per kilogram,

News and Notes

At the Fifty Seventh Annual Meeting of the **American Pediatric Society,** held at Stock bridge, Mass, May 13 to 15, 1947, the following officers were elected for 1947 48:

President, Dr. Grover F. Powers, New Haven
Vice President, Dr Harold B. Cushing, Montreal
Secretary and Treasurer, Dr. Henry G Poncher, Chicago
Member of Council, Dr. James L Wilson, Ann Arbor

The following were elected to membership: Drs. Dorothy Anderson, John A. Anderson, Richard L Day, Harry J Ebbs, Katherine Bain, Samuel Rapoport, Albert D. Kaiser, Murray H. Bass, Elvira Goettsch, Ralph V Platou, Edith L Potter and Robert Ward.

At the recent meeting of the **Society for Pediatric Research,** the following officers were lected for 1947 48:

President, Dr Donovan J. McCune, New York
Vice President, Dr. Sidney Farber, Boston
Secretary Treasurer, Dr Robert Ward, New York

The Harvard Medical School has announced an intensive graduate course in pediatrics o be held at the Massachusetts General Hospital, Boston, Oct. 13 to 24, 1947. The course will run six hours daily for two weeks and will include diagnosis, therapy, and prevention of diseases of infants, children, and adolescents with emphasis on recent advances For further information write: Course for Graduates, Harvard Medical School, Boston, Mass

---

Dr Dwain N Walcher, instructor of pediatrics at Yale Medical School, has been ap pointed to a newly created position of Assistant Professor of Pediatrics at the Indiana Uni versity School of Medicine at Bloomington.

Hospital bills, salaries for physical therapeutists, nurses, and other charges which may be essential to good medical care for patients with poliomyelitis, may be paid for by the chapters of the **National Foundation for Infantile Paralysis.** The nearest local chapter should be contacted for aid to patients in need of financial assistance to meet the cost of good medical care The funds available for this purpose come from the March of Dimes.

In the first quarter of 1947, approximately 973,000 births were registered in the United States, according to preliminary estimates released by the National Office of Vital Statistics, U. S. Public Health Service, Federal Security Agency This is 46 5 per cent more than the 664,000 births estimated to have been registered in the first three months of 1946, and it is 29 per cent more than the number recorded in the first quarter of 1943, the year which held the record for births until outstripped by 1946

The following have been certified by the **American Board of Pediatrics:**

CANDIDATES EXAMINED IN CHICAGO, APRIL 25, 26, AND 27, 1947

Irving R Abrams, 6740 North Sheridan Road, Chicago, Ill
Cornelius Benton Burns, 57 South Broughton Street, Orangeburg, S. C.

been using when first feeding babies with diarrhea after the initial period of food restriction. That amounts to 3.3 per cent dextrose and 3.3 per cent Amigen. The mineral composition has been changed by the special salt mixture, so that if one, for instance, were able to get 180 c.c. per kilogram of the D.A.S. solution into the baby, he would be receiving almost exactly the mineral that he would be getting if he were taking 100 calories per kilogram in the form of human milk. That was the basis for the particular construction of the salt mixture: to get in sodium, potassium, calcium, magnesium, and chloride in the proportion and amounts that a breast-fed baby would be getting them. If you got in just 100 c.c. instead of 180 c.c., it would be somewhat short in mineral but perhaps would be an adequate amount, since even the breast-fed baby does not have the retention of minerals that would match his intake, and, of course, the discrepancy is much greater in cases of a baby fed cow's milk where the intakes are very much greater than the retention. I imagine that if the baby got 100 c.c. per kilogram, it would still be adequate for retention purposes. If we followed these subcutaneous injections of D.A.S. with 10 per cent glucose intravenously and followed or preceded that with administration of the fat emulsion (20 c.c. per kilogram), and then gave parenteral vitamins in the usual way, we would be giving 80 calories per kilogram, up to about 4 Gm. protein per kilogram, and up to 12 Gm. carbohydrate per kilogram with an appreciable amount of fat. The next thing, I think, that we should look into to make it simpler from a technical point of view would be to see, Dr. Rutledge, whether we could incorporate in the fat emulsion the fat-soluble vitamins, so that we could avoid repeated intramuscular injections of vitamin preparations. With any of the intravenous or subcutaneous injections it would be a simple matter to add the water-soluble vitamins, so that fewer separate injections would be needed.

DR. DAVIS.—Dr. Hartmann, would you suggest that with the continuous intravenous drip, we switch flasks from the D.A.S. to glucose?

DR. HARTMANN.—Yes, I think that if you are successful in establishing a continuous intravenous drip, you should take full advantage of the situation, and pass from one to another. You could administer fat, and when it is practically all in, wash the rest of it in with the glucose or with a plasma transfusion and go on in that manner.

DR. HARRY LAWLER.—Once the continuous intravenous drip is in place, it is not necessary to restrict the intake to such limited quantities as those mentioned in your discussion, since high concentrations of Amigen and glucose may be given without danger. High concentrations of these substances may also be given subcutaneously in selected cases.

DR. HARTMANN.—Yes, that is true. What we have worked out was for all babies. Something was needed that would not cause irritation under any circumstances. Of course, you know for a fact that you are not going to be able to use the intravenous route indefinitely in this baby. Technical difficulties

Kate M. Freund, 115 East 89th Street, New York City, N. Y.
Bernard German, 2 Shanley Avenue, Newark, N. J.,
Richard H. Godwin, 53 Dorchester Road, Rockville Centre, N. Y.
Bernard Greenberg, 681 Ocean Avenue, Brooklyn, N. Y.
Clifford, G. Grulee, Jr., Pediatric Dept., University Hospitals, Minneapolis, Minn.
Francis Woodrow Helfrick, Castaner, Puerto Rico
Samuel Fredrick Jenkins, 231 West 139th Street, New York City, N. Y.
Neil Fremont Lebhar, Ray Street, Westport, Conn.
Maurice Lenarsky, 380 Riverside Drive, New York City, N. Y.
William I. Levinstein, 1125 Monroe Avenue, Rochester, N. Y.
Philip Frederick Lustbader, 577 Eastern Parkway, Brooklyn, N. Y.
Simon B. Mendelsberg, 1755 East 13th Street, Brooklyn, N. Y.
Eleanor Kellogg Peck, Stoneridge, Cedarcliff Manor, Poughkeepsie, N. Y.
Benjamin Reder, 38 Rock Street, Fall River, Mass.
Edward L. Robinson, 224 High Street, Hamilton, Ohio
George David Rook, 114 East 54th Street, New York City, N. Y.
Martha L. Smith, New York Hospital, New York City, N. Y.
Mildred Stanley, Peoples Bank Building, Tyler, Texas.
Henry B. Strenge, Strong Memorial Hospital, 260 Crittenden Boulevard, Rochester, N. Y.
Douglass W. Walker, 724 Main Street, Laconia, N. H.
Irving Bernard Wexler, 1672 Ocean Avenue, Brooklyn, N. Y.
Henry Harcus Work, Jr., 155 Hughes Street, Buffalo, N. Y.

The Social Aspects of Medicine

THE SOCIAL ASPECTS OF MEDICINE: A STATEMENT

JOSEPH PALMA, M.D., F.A.A.P.
(Chairman for Hawaii)

I was interested to note in the April, 1947, Vol. 30, No. 4, JOURNAL OF PEDIATRICS, an article on compulsory prepaid medical care by one Dr. Ernst P. Boas, Chairman of the Physicians' Forum. I think this is in keeping with the democratic principle of hearing from the proponents as well as the opponents of compulsory prepaid medical care which is also euphoniously called organized prepayment," also "compulsory medical insurance," all of which is only a play on the music of words because this scheme, aimed at regimentation of not only the profession but of all the people, is in reality a compulsory sickness tax.

In the future, I would suggest that all writers on this subject, either for or against, offer some documentary evidence as to who they are and whom they front for. As an absolute *must* on the list of reading on this subject, all physicians should avail themselves of the pamphlet "Blueprint for the Nationalization of Medicine," by Marjorie Shearon, Ph.D., Post Office Box 4034, Chevy Chase 15, Maryland. Single copies can be obtained for twenty five cents and I know of no better investment in education, especially for such a trifling sum. Other reading on this must-list and a virtual textbok on the subject is, "Compulsion, the Key to Collectivism," published by the National Physicians' Committee for the Extension of Medical Services, Inc., 75 East Wacker Drive, Chicago, Illinois.

Any attempt to answer in detail, or point by point, the specious arguments advanced by Dr. Boas and others of like ilk of the professional do-gooders and fellow travelers, is a mistake and a waste of time. The primary concern of all of us is a matter of principle, the preservation of the present high standards of medical care, and the preservation of liberty in this freedom loving land. The cornerstone of our great system of American medicine—the best that the world has yet produced under any system—is the *maintenance* of the sacred patient-and-doctor relationship. No government, no bureaucrat, no third party must ever be allowed to intrude into this most intimate and personal relationship. The proponents of compulsory prepaid medical care by government taxation would take us on the first step on the road to statism, collectivism, totalitarianism, communism, or whatever term you wish to apply to the foreign ideology which is in opposition to the American way of life.

In answer to the suggestion in Dr. Palmer's letter for information concerning Dr. Ernst Boas I give the following from Vol. 24, 1946-1947, Who's Who in America.

> Ernst Philip Boas, born February 4, 1891. B.S. Columbia, 1910, M.A. 1912, M.D. 1914, Instructor in Pathology, College of Physicians and Surgeons (Columbia), 1917, Instructor in Physiology, 1920-21; Medical Director Montefiore Hospital, 1921-29. Post graduate teacher, diseases of the heart, Columbia, since 1926; Assistant Clinical Professor of Medicine since 1928; Associate Editor Modern Hospital, 1923-29; attending physician Montefiore Hospital, *1929-30*, Associate physician, Mt. Sinai Hospital. Capt. Med. R.C. 1917-19, Chief of Medical Service, Base Hospital 63, A.E.F., Chairman, Physicians Forum for Study of Medical Care. Fellow A.M.A.; Mem. Soc. for Clin. Investigation, Harvey Society, New York Academy Medicine, New York Tuberculosis and Health Assn. (dir.; chmn. heart com. 1933-42). Phi Beta Kappa, Alpha Omega Alpha. Author: The Challenge of Chronic Diseases, 1929; The Heart Rate, 1932; *The Unseen Plague* Chronic

Sex Education: A Guide for Parents, Teachers, and Youth Leaders. Cyril Bibby, M.A., M.Sc., F.L.S., New York 1946, Emerson Books, Inc., 311 pages, Price $2.50

There has been no more perplexing problem to the parent, educator, and physician than that of sex education. Everyone is in agreement that sex education is not only desirable but necessary, but the questions of just what it should consist of and how and by whom it should be taught are far from being settled. There is no other subject in which there has been so much "passing the buck." Most parents and educators have little sound factual knowledge or information to form the basis of good instruction, while physicians are to a large extent limited to didactic physiologic instruction which is only one phase of sex education. Others approach it from the very unsatisfactory side, so far as education is concerned, of morals. On the one hand there is the danger of minimizing the importance of the subject and on the other the danger of overemphasis by the fanatical social hygienist. It is a most common experience for the physician to be asked for "books on the subject." Over a period of years we have had to reach the conclusion that, unfortunately, there was no really satisfactory book on the subject, and, further, that sex education, except, perhaps, for a few specific physiologic phases, is not a matter for formalized instruction or a "course," but is something that must be integrated with the entire life of the child from the preschool age to maturity. Recently, a book on sex education by an English author, Cyril Bibby, Education Officer to the Central Council for Health Education, came to our desk, which we feel is the sanest text on the subject which has as yet appeared. It should be of great value to the parent and teacher. Feeling we might be prejudiced in favor of the book because it expressed so well the ideas the reviewer had rather vaguely reached as a pediatrician, we gave it to the headmaster of a secondary school for his opinion. His comments not only coincide with the opinion of the reviewer but express so well the theme of the book that we quote them.

Dear Dr. Veeder

To my mind the distinctive quality of Bibby's *Sex Education* is its sanity. Bibby sees sex education as a continuous process from the cradle to the grave, with schools as only one—but that a very important—educational influence.

I am impressed by Bibby's vision and understanding of the picture as a whole, by his forthright honesty, by his imaginative ingenuity in pointing out ways in which sexual knowledge and attitudes can be introduced naturally in a variety of school courses. At the same time he is obviously sound in pointing out the different types of instruction which are appropriate at different age levels. That he can include specific, detailed suggestions and not become dogmatic is to my mind a tribute to his skill. The many questions and answers in the closing chapters of the book are perhaps more numerous than a good teacher needs, and even these questions, in all their detail, will hardly make an unsuccessful or mediocre teacher successful.

In my judgment, the book does about all that a book can do. As you know, it develops the thesis, so far as schools are concerned, that the way to impart knowledge of sex is in a natural and normal way whenever it arises in school courses and in school relationships. It deals, as well, with suggested training to make teachers more skilled in their teaching of it. We are left with the limitations of teachers as human beings—and those limitations are very real. The book is a sensible, useful approach to a "hot" subject, discussion of which is too often surrounded with an atmosphere of taboo and morbid curiosity.

I have put the book in our faculty room for faculty reading, and I plan to have the faculty discuss means of adopting some of its suggestions when we take up questions of our curriculum and teaching in coming faculty meetings.

Sincerely yours

(Signed) ROBERT CUNNINGHAM

B. S. V.

My dear Dr. Park:

I am submitting the enclosed manuscript for consideration of publication in the very interesting "Social Aspects of Medicine" column in the JOURNAL OF PEDIATRICS. The rapid growth of these cooperative ventures and the response with which they are meeting, indicate a widespread interest among the lay public in such enterprises, and it should help to round out the picture you are presenting in the JOURNAL. There are a thousand families already enrolled in the group here, in spite of a medical service bureau, Blue Cross, and at least five commercial insurance plans.

It is, of course, my hope that you will see fit to publish this paper, for we are genuinely interested in progressive medical measures and would welcome the comments it would stimulate. Our plan is flexible and we not only wish to improve it but to make it acceptable to the medical profession.

(Signed) W. A. MACCOLL, M.D.

THE GROUP HEALTH COOPERATIVE OF PUGET SOUND

WILLIAM A. MACCOLL, M.D.

Interest in the social aspects of the practice of medicine is not limited to physicians. The greatest concern belongs to the consumer group whose lives, in number, are far more extensively involved. A common meeting ground of these interests lies in the various Group Health Cooperative plans formed, forming, or in the planning. It should be of interest to readers of this department to have a report on the operation of one of these, together with the principles underlying the organization.

The Group Health Cooperative of Puget Sound, Seattle, Wash., has been established by physicians and laymen in concert, and may serve as a prototype for similar organizations. This clinic has been in operation for six months as a Cooperative, but the group of physicians had been conducting an industrial contract practice for twelve years previously, and continue to do so in the present transition period.* The Cooperative plan has not yet been recognized by the local medical society or the American Medical Association, although data on all phases of its operation have been submitted to the latter for study. It is the conviction of those immediately concerned that this form of provision for medical care is ethical, worthy, meets the needs of physician and consumer, and will, if allowed to develop sufficiently, limit the need for any extensive federal intervention in the distribution of medical care either in urban or in rural areas. For this ideal, at any rate, the physicians have given up their memberships in the medical societies and stand relatively alone in what they believe to be a forward step in the progress of American medicine.

A description of a Cooperative and an outline of its functions as a group health organization will clarify subsequent discussion. The American Cooperatives are founded upon the Rochdale Cooperative principles, expressed by the five points:

1. Open membership: no discrimination on the basis of race, sex, creed, or economic status.
2. Fairness and equal rights for all.
3. Democratic control: one member, one vote.
4. Not for profit but for service.
5. The users thereof profit thereby.

Family Membership in a Group Health Cooperative is through subscription of an initial investment in the capital assets of the Cooperative. The membership fee in the present case is $100.00, payable over a twenty-month period. This sum is returnable in full should the member leave the service area, or may be willed at death. The membership funds are used to provide the buildings and equipment for the organization and are not employed for operative purposes.

A Board of Trustees, elected by the members from their number, manages the business affairs of the organization, and may appoint committees to assist them. The board meets

*Private patients are also seen, all fees going to the central fund.

result. The editor would like to know how the readers feel about the editorial policies of the JOURNAL, what criticisms they have, and, more important, what suggestions they have to offer for its improvement.

A little over a year ago a department called "Social Aspects of Medicine" was started which has tried to present facts and ideas regarding this moot subject. Both the radical and conservative sides have had full opportunity for statements. It is not and never has been a propaganda column. A few months ago we started placing case reports in a special department printed in 10 point solid type, rather than the customary small 8 point. In this issue we are experimenting with two new departments, and we would like comment on their desirability and value to the reader. One, for lack of a better term (and perhaps you can suggest one), we term "Medical Care." If it proves of interest and value, it is our thought to present an article each month on some phase of pediatric practice which will tell in a direct, straightforward way how to handle or do it in practice. To start the department, in this issue, Dr. Philip M. Stimson, a recognized authority on the subject, discusses the treatment by the pediatrician and practitioner of poliomyelitis in its acute stage. Another department with which we plan to experiment is entitled "Clinical Conference." Many of our hospitals hold weekly conferences or "grand rounds," in which the everyday run of hospital material is presented and rather extemporaneously discussed. Many of us plan our trips so as to attend these conferences as we visit various cities. For this issue, Dr. Alexis Hartmann at the St. Louis Children's Hospital consented to have one of his weekly conferences recorded on a Soundscriber and transferred to print.

The JOURNAL, after fifteen years of growth, finds itself in a position to experiment editorially, and to change and develop along new lines in an attempt to be of greater value and interest to its readers. As a first step, we are asking our readers to tell us what they like or dislike about the editorial policy of the JOURNAL, what they want continued or changed, what they feel about these new departments, and what suggestions they have which would make the JOURNAL of more value and interest to them. In other words, we want to do what, perhaps, we should have done before, and what a good industrial manager would do—try to find out what the consumer wants.

The publishers, The C. V. Mosby Company, have never interfered with or attempted to influence the editorial policy of the JOURNAL in any way. They are continuing the same policy.

We would appreciate hearing from you.

BORDEN S. VEEDER.

3720 Washington Ave.,
St. Louis 8, Mo.

practice by its members. "The Cooperative shall not supervise, regulate or intervene in, the professional relationship between any physician and his patients."

2. The staff shall consist of the physicians employed by the Cooperative and the Chief of Laboratory. Each member of the staff shall have one vote in the business of the staff, and the staff shall adopts its own by-laws, which, among other things, shall:

A. Define procedures to be followed in diagnosis and treatment to the end that all staff members will comply with standards obtaining currently in the leading medical institutions of the country.

B. Define the scope of practice of each specialty.

C. Define the duties of each department of the staff.

D. Make provision for regular meetings of the staff for educational and professional purposes, and for the maintenance of the highest standards of practice.

E. Make provision for the election and removal of the chief of staff or of any member of the staff.

3. Staff members shall give their full time to the performance of their duties for the Cooperative, except for such teaching as may be desired.

4. No physician shall be employed by the Cooperative who is not:

A. Licensed to practice medicine in the State of Washington;

B. A graduate of a school accepted as Grade A at the time of his graduation:

C. Acceptable to the rest of the staff by a two thirds vote by secret ballot;

D. No physician will be employed as a specialist unless he has had at least the training required by the examining board in his specialty.

5. The chief of staff shall be elected by the staff to serve for three years, subject to re-election. If not re-elected, he may continue to serve on the staff. His duties shall include:

A. Enforcement of all regulations of the staff including those relating to the standards of treatment and care;

B. Recommendation to the staff of measures designed to effectuate constant improvement in the standards of care and service;

C. Performance of such other duties as may be assigned in the by-laws of the staff.

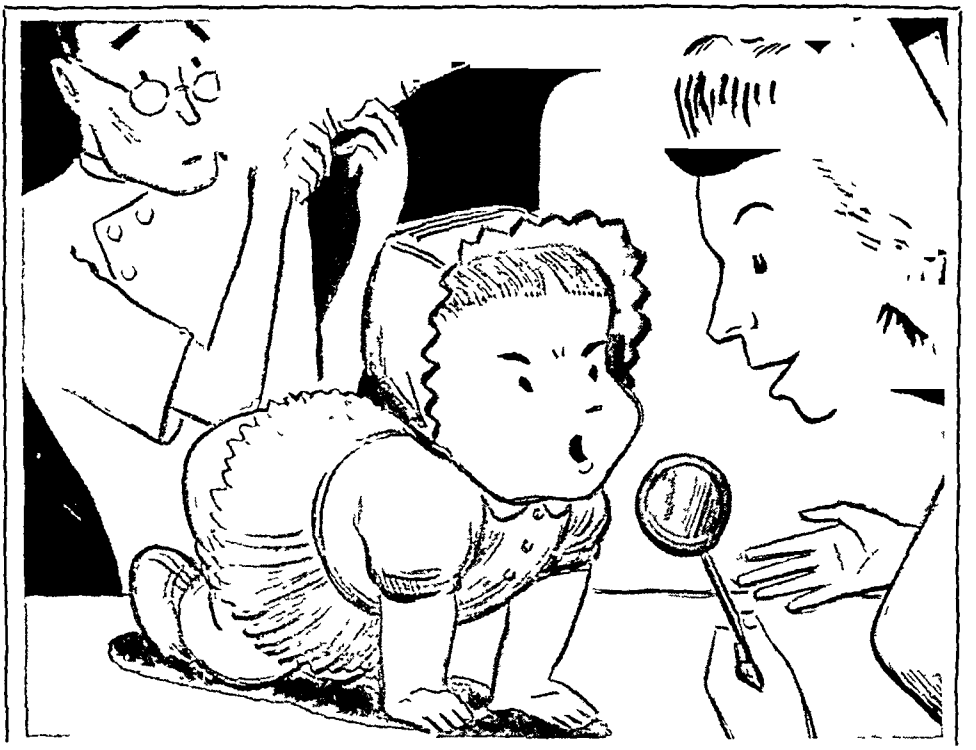
6. The Cooperative will set up a retirement trust fund for each staff member, contributing one-half the required amount to assure $25,000.00 as a retirement benefit.

7. Dismissal from the staff will be the result of any unethical conduct as defined in the Code of Ethics of the A.M.A. or for refusal to cooperate with the other members of the staff in the performance of his duties, or for violation of the by-laws of the staff or the contract. Dismissal for these causes will be determined by the staff at a fair hearing. If the Cooperative dismisses a physician for any reason other than retirement at 65 years or cause, they shall pay him six months' salary as liquidated damages.

8. The chief of staff shall submit to the Cooperative annually a budget for salaries, said monies to be divided by the staff in accordance with their own wishes. Fifty per cent of any profits in a given year shall be returned to the staff for bonus distribution, the remaining half to be used for research funds, equipment, and improvements in plant and facilities.

The physicians' salaries range from $500 to $1,000 per month, with a definite program of increase on an annual basis. These figures are comparable to the income of a private practitioner grossing $12,000 to $18,000 annually. All expenses for equipment, supplies, facilities and personnel are met by the organization. The salaries quoted are net figures, giving the physician a dependable, assured income irrespective of good or bad months, uncollected bills, etc. A group accident and health policy is carried by the clinic for the physicians, and physicians are entitled, free, to all the medical coverage of a Cooperative member.

The Staff By-Laws are consistent with the contract abstracted above, with provisions for the regular educational and professional meetings of the staff, the maintenance of professional standards, required postgraduate study, ethical behavior, functions of various committees, and the management of their own affairs. Standards of treatment are described as those prevailing at the best teaching institutions and published in the standard reference works in the various fields of medicine and surgery.



"Don't try to bribe me—I want D-P-T★"

Maybe babies don't cry for them—but they will be better protected with Cutter's combined vaccines. And run less risk of painful reactions, too! Here's why·

1. *Phase I pertussis organisms* for D-P-T are *grown on human blood* —to assure high antigenicity of organisms, and to avoid the danger of anaphylactic shock from heterologous animal protein.
2. *Diphtheria and tetanus toxoids* are so *purified* that every cc. contains well over a single human dose each.
3. *Concentration of toxoids*—plus 40 billion Phase I pertussis organisms per cc.—permit a dosage schedule of only 0.5 cc., 1 cc., 1cc.

You'll find advantages in another Cutter product, too—D-P-T *(Alhydrox)*. It provides higher immunity levels than alum precipitated vaccines. Cuts to a minimum such side reactions as persistent nodules and sterile abscesses. And presents less pain on injection because of a more physiologically normal pH.

Choose D-P-T—Plain or Alhydrox—you'll appreciate them in your practice.

★ *Cutter's brand of combined diphtheria, pertussis and tetanus antigens.*

Cutter Laboratories, Berkeley 1, California
Chicago • New York



Need an "answer book" for parents in your practice? Write for gift copies of Cutter's new booklet— "How to Prevent Diseases of Children."

CUTTER

Fine Biologicals and
Pharmaceutical Specialties

recognized by the Cooperative as desirable human rights and are provided for in the planning on the thesis that the best physician is the healthy and happy one. No limitations as to number of patients, laboratory facilities or procedures are placed upon him. So long as he continues to play his part in the integrated organization of the staff, his position is secure and he may practice in an unobstructed field.

Cooperative medicine is not in the ordinary sense competitive, since the patients are allied to the group through a parallel interest. The worst features of competition in the practice of medicine are eliminated. But the desire to produce the best, to establish a local reputation for sound practice and to contribute to the group, the community, and the profession are all retained. There is no temptation to stoop to the attractive, bizarre, and the spectacular practices which have arisen from time to time in medicine and have done so much to raise the cost of care and lower public confidence in the profession.

The educational program possible in a Cooperative is one which is of unusual value. The constant publication of material on maintenance of good health, of special articles written by the staff for the members, of information relative to current and anticipated epidemics, all these are of aid in carrying out the prevention program. The greater the success of the preventive measures, the healthier the patients, the lower the cost of care, and the less the burden for the physician. To the pediatrician, the educational feature is one of the greatest challenges of his position. Able to keep the parents informed on all matters of child care and training, on growth and development, on all matters of health from the prenatal to the adolescent, he has an unequaled opportunity to present to his fellows at "graduation" a group of physically and mentally sound individuals who are ready and able to take their places as productive citizens in the community.

At the present time, the Group Health Cooperative of Puget Sound is operating one large central clinic and its own hospital. As the membership grows and the numbers increase in outlying areas, it is projected that medical offices of suitable size will be installed, manned by well-trained general practitioners on an approximate ratio of one physician to 500 families. These units may include infirmaries for minor surgery and lesser illnesses. Diagnostic problems, cases requiring specialized care or treatment, and all major surgery will be referred to the central unit. The specialists from the central clinic will make rounds of these centers periodically to hold diagnostic and teaching clinics for the dual purpose of educating the practitioners in the specialty developments of medicine, and in aiding in the care of the patients on a local level, bringing urban medicine to the rural areas. The local physician will hold full staff membership in the central organization, attending staff meetings, rotating night duties with his neighbors, and enjoying many of the advantages of the group.

This program has the backing of the State Grange, labor organizations, civic groups, and the Cooperative League of the U. S. A.

The above report is presented as a practical method of solving a major problem in medical care distribution. It represents a prepayment, insurance-based, consumer-owned but professionally conducted method of supplying the best practical medical care to a wide service area in a manner which will not only apply medical knowledge efficiently but provide for the most economical and profitable use of the trained physician and surgeon.

Articles to appear in early issues of

The JOURNAL OF PEDIATRICS

COMBINED IMMUNIZATION AGAINST DIPHTHERIA, TETANUS, AND PERTUSSIS IN CHILDREN OVER 3 MONTHS OF AGE; INCLUDING AN EVALUATION OF THE EFFECTIVENESS OF TWO IMMUNIZING AGENTS.
By Paul A. di Sant' Agnese, New York, N. Y.

COOLEY'S ERYTHROBLASTIC ANEMIA IN TWO CHINESE BOYS.
By Luther B. Gardner, M.D., New York, N. Y.

IMPETIGO NEONATORUM CONGENITA. FIVE CASES IN SIBLINGS.
By Abraham Gilner, M.D., and Irving Nelson, M.D., Brooklyn, N. Y.

HYPERSENSITIVITY TO PRIVINE.
By Jacob Greenblatt, M.D., Stamford, Conn.

A REVIEW OF THE SUBJECT OF CONGENITAL HEMIHYPERTROPHY AND A COMPLETE CASE REPORT.
By John Ward, M.D., and Henry H. Lerner, M.D., Salt Lake City, Utah.

PSYCHIATRIC SERVICES IN A CHILDREN'S HOSPITAL.
By S. A. Szurek, M.D., San Francisco, Calif.

MYOCARDIAL INFARCTION IN THE NEWBORN INFANT.
By Robert M. Ravich, M.D., and Philip Rosenblatt, M.D., Brooklyn, N. Y.

THE ULCERATED URETHRAL MEATUS IN MALE CHILDREN.
By Paul Freud, M.D., New York, N. Y.

LIPOCHONDRODYSTROPHY (GARGOYLISM).
By M. E. Lahey, M.D., R. D. Lomas, M.D., and T. C. Worth, M.D., Houston, Texas.

ABDOMINAL ABSCESS AS A CAUSE OF INTESTINAL OBSTRUCTION IN THE NEWBORN INFANT.
By Julius B. Richmond, M.D., and Herbert R. Moore, M.D., Chicago, Ill.

CONGENITAL DESMOID OF THE ABDOMINAL WALL.
By David Dean Brockman, M.D., Durham, N. C.

HERNIATED OVARY IN AN INFANT.
By Norman Duren, M.D., F.A.C.S., and S. Rosa Frank, M.D., Beaumont, Texas.

EPIDEMIOLOGIC STUDIES IN DENTAL CARIES. II. THE INCIDENCE OF CARIES AMONG INSTITUTIONALIZED CHILDREN.
By Julian D. Boyd, M.D., and Virgil D. Cheyne, D.D.S., Iowa City, Iowa.

A COMPARISON OF VITAMIN C IN MOTHERS AND THEIR PREMATURE NEWBORN INFANTS.
By Lawrence B. Slobody, M.D., Reuel A. Benson, M.D., and Joan Mestern, New York, N. Y.

SEX PRECOCITY AND THE ADRENOGENITAL SYNDROME.
By Beatrice Bergman, M.D., New York, N. Y.

SELF-DEMAND FEEDING AND INDULGENCE IN EARLY INFANCY.
By Gustave F. Weinfeld, Highland Park, Ill.

A STUDY OF THE ABSORPTION AND EXCRETION OF ORAL PENICILLIN IN CHILDREN.
By Milton Markowitz, M.D., and Ann G. Kuttner, M.D., Irvington-on-Hudson, N. Y.

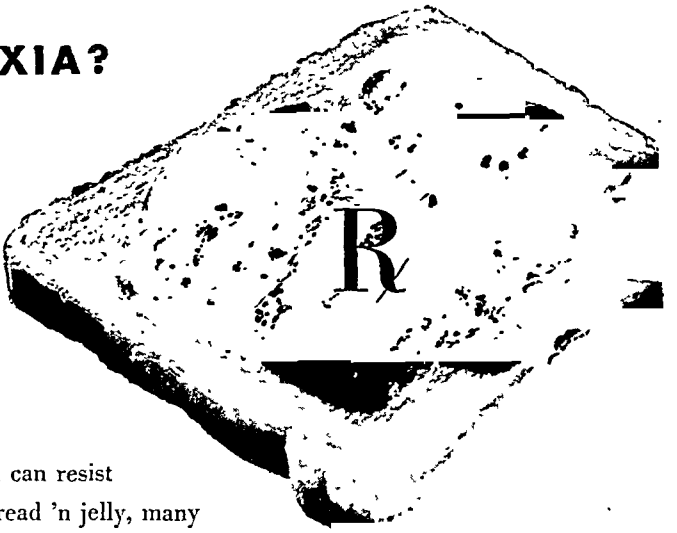
METHOD OF HOLDING THE HEAD FOR SCALP VEIN TRANSFUSIONS AND RESTRAINING THE LEG FOR INTRAVENOUS THERAPY.
By Peter H. Spohn, M.D., and Taylor Statten, M.D., Toronto, Ont.

Beach M. Chenoweth, Jr., 620 South 20th Street, Birmingham, Ala.
Robert Cohen, 4063 Radford Avenue, North Hollywood, Calif.
James A. Conner, 5307 Hyde Park Boulevard, Chicago, Ill.
LaMeta Frances Dahl, 4200 East 9th Street, Denver, Colo.
Joseph K. David, Jr., 411-12 Professional Building, Jacksonville, Fla.
Gerti Dooneief, 687 Montgomery Street, Brooklyn, N. Y.
Richard E. Dukes, 602 West University Avenue, Urbana, Ill.
Aaron Robinson Edwards, 2315 Parkwood, Pittsfield Village, Ann Arbor, Mich.
James Nickolas Etteldorf, 376 South Bellevue, Memphis, Tenn.
Donald G. Evans, 205 Stimson Building, Seattle, Wash.
Elizabeth Gentry, Maternity and Child Health Division, Texas State Health Department, Austin, Texas
Joseph R. Goran, 1035 East 19th Avenue, Denver, Colo.
Walter A. Goss, Jr., 602 Mayer Building, Portland, Ore.
George Wainwright Griffin, 2501 North 16th Avenue, Birmingham, Ala.
Wesley Robert Heard, 1417 Wilson Avenue, San Marino, Calif.
Helen Dickerson Heinen, 2376 East 71st Street, Chicago, Ill.
Charles W. Ihle, Jr., Suite 507, 100 North Phillips Street, Sioux Falls, S. D.
Charles Godwin Jennings, 356 Hillcrest Road, Grosse Point, Mich.
William R. Jones, 201 Doctors Building, Columbus, Ga.
Hilda Knobloch, University Hospital, Ann Arbor, Mich.
John Harry Lange, 104 Ponce de Leon Avenue, Atlanta, Ga.
John W. Leech, 429 Penn Avenue, Pittsburgh, Pa.
Conway Stone Magee, Gordon Building, Lake Charles, La.
Cornelius Shepherd Meeker, 222 North Genesse Street, Waukegan, Ill.
Alberta West Parker, 919 The Alameda, Berkeley, Calif.
Hugh W. S. Powers, Jr., 32 West Biddle Street, Baltimore, Md.
Donald T. Rendel, 5231 Holman Avenue, Hammon, Ind.
Mary L. Richardson, 2600 North Lawrence, Philadelphia, Pa.
Julius B. Richmond, 1819 West Polk Street, Chicago, Ill.
Harry Osbourne Ryan, 65 North Madison, Pasadena, Calif.
John W. Schonwald, 2206 MacArthur Boulevard, Oakland, Calif.
B. J. Siebenthal, 120 North Lafayette Boulevard, South Bend, Ind.
William A. Silverman, 175 East 79th Street, New York, N. Y.
Benjamin Spritz, 1755 Beacon Street, Brookline, Mass.
Paul Stone Strong, 1033 Gaylay Avenue, Los Angeles, Calif.
John Dudley Tobin, 701 Kenwood Parkway, Minneapolis, Minn.
David F. Weaver, 1008 First National Bk. Building, Davenport, Iowa
Ross R. Weller, Suite 310, Carpenter Building, Milwaukee, Wis.
Alvin DuBois Wert, 1020 South West Taylor Street, Portland, Ore.
William Kerr Zollinger, 1838 Parkwood, Toledo, Ohio
Ralph L. Zucker, 2318 Monroe Street, Toledo, Ohio

CANDIDATES EXAMINED IN BUFFALO, MAY 10 AND 11, 1947

Ruth Virginia Berney, 16 Lyons Avenue, Newark, N. J.
Nils William Bolduan, 1515 State Street, Santa Barbara, Calif.
Erika Bruck, Childrens Hospital, 219 Bryant Street, Buffalo, N. Y.
Robert Stewart Cleland, 136 North Madison Avenue, Pasadena, Calif.
John Henry Dale, Jr., 525 East 68th Street, New York City, N. Y.
John N. DeHoff, 147-05 Roosevelt Avenue, Flushing, N. Y.
Carl Drayer, 1756 Ocean Avenue, Brooklyn, N. Y.
Anne Mary Drislane, 758 Madison Avenue, Albany, N. Y.
Milton Carl Fleish, 461 Cornwall Street, Hartford, Conn.
James T. Fowler, United States Naval Hospital, Bethesda, Md.
Lewis M. Fraad, 525 East 68th Street, New York City, N. Y.

EVER TRY BREAD 'N JELLY THERAPY IN ANOREXIA?



Because few children can resist a luscious piece of bread 'n jelly, many pediatricians are using it as a weapon to combat anorexia—the commonest complaint in pediatrics. With a spoonful of 'Ryzamin-B' No. 2 added to the spread, this universal favorite becomes a potent source of B complex vitamins to provide the needed stimulus to lagging appetites. So pleasant is its rich, honey-like flavor that children seldom are aware that they are taking medicine. Most children take 'Ryzamin-B' No. 2 right off the spoon; all children enjoy it when given as a delicious spread mixed with jam or peanut butter or dissolved in milk, fruit juice or their favorite beverage.

Containing the *natural* B complex as a concentrate of Oryza sativa (American rice) polishings, 'Ryzamin-B' No. 2 also supplies potent synthetic B factors.



'RYZAMIN-B' BRAND RICE POLISHINGS CONCENTRATE **NO. 2**

WITH ADDED THIAMINE HYDROCHLORIDE, RIBOFLAVIN AND NICOTINAMIDE

TUBES OF 2 OZ. AND BOTTLES OF 8 OZ

'Ryzamin B' registered trademark

BURROUGHS WELLCOME & CO (U.S.A.) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

Book Reviews

Manual of the Common Contagious Diseases. Philip M. Stimson, M.D., ed. 4, Philadelphia, 1947, Lea & Febiger, 503 pages, 67 illustrations, 6 color plates.

This fourth edition of Stimson's well-known text is an unusually complete revision and some fifty pages larger than the third. Many new developments in treatment, prophylaxis, and diagnostic measures have taken place in the field of the contagious diseases since the third edition in 1940, some the direct result of war medicine. All of these, including the use of the newer antibiotics, are incorporated in the new text. The chapter on poliomyelitis has been completely rewritten and enlarged and is of unusual importance, due to the marked increase of poliomyelitis in the last two years. It is a book not only of value to the student but of great value to the practitioner, as all of the newer accepted knowledge of the common contagious diseases is presented in a clear, direct manner.

B. S. V.

Psychiatric Interviews With Children. Helen Leland Whitmer, New York, 1946, The Commonwealth Fund, 443 pages. Price $4.50.

This book is one of many worthy byproducts resulting from the Commonwealth Fund's interest in psychiatry. It has twofold merit for the pediatrician. It describes at length, through the explanatory introduction and notes of the editor as well as through presentation of ten detailed case reports, what constitutes psychotherapy of children as practiced by teams of individuals in the setting of child-guidance clinics. The pediatrician who wonders what is going on within the walls of such a clinic, what is "happening" there to the patient that he has referred, will find answers in the pages of this book.

Probably of greater educational value to the physician who treats child patients and their parents, is the section on "Relationship." By this is meant the interplay of forces between psychotherapist and patient, which is considered the essence of dynamic therapy. The physician will learn much of value from this chapter if he substitutes in his reading the title "pediatrician" wherever the name "psychotherapist" appears. Resulting from this substitution should come insight as to the psychological role every doctor plays in relationship to patients. This element of patient care is seldom taught in the ordinary process of medical education, yet it constitutes a fundamental and basic principle in all treatment. Although the book is addressed primarily to students and practitioners of child psychiatry, it will stimulate as well as inform the pediatrician who is becoming increasingly interested in and practicing psychotherapy in his physical management of children and their parents.

SENN.

The Pharmacopoeia of The United States of America. Ed. 13, Easton, Pa., 1947, Mack Publishing Co.

This is the thirteenth revision of the United States Pharmacopoeia since its first publication in 1920, and was authorized by the U.S. Pharmacopoeal Convention held in 1940. There are approximately 100 additions and 120 deletions. Included in the additions are such agents as penicillin, typhus, and yellow fever vaccines, and diphtheria and tetanus toxoids. Tincture of Iodine 7 per cent has been deleted, and the mild (2 per cent) tincture of the earlier editions is retained as Iodine Tincture.

The most striking change is the use of the English titles for therapeutic agents in the leading position, and the rearrangement of the order on this basis. Latin titles are retained but made secondary. In 1828 an entire edition was published in Latin. The Pharmacopoeia has also adopted the tables of metric doses with approximate apothecary equivalents which were recently adopted by The National Formulary and New and Nonofficial Remedies, which simplifies prescribing.



A New Mosby Book!

Clendening & Hashinger's

METHODS *of* DIAGNOSIS

A New, Completely Practical Work for
"the Physician at the Bedside of the Patient"

By LOGAN CLENDENING, M. D., F. A. C. P., Late Professor of Clinical Medicine and History of Medicine; and WARD H. HASHINGER, M. D., F. A. C. P., Professor of Clinical Medicine, both of the University of Kansas School of Medicine

1064 Pages, 125 Illustrations • Price $12.50

THIS book has been prepared with YOU in mind—you, at the bedside of your patient, analyzing the patient's story, noting symptoms and signs, and finally interpreting laboratory findings. On that basis, METHODS OF DIAGNOSIS covers all the diagnostic possibilities of a given case.

First, the basic principles of diagnosis are set forth. Then complete sections are devoted to the basic entities in diagnosis: symptoms, physical signs, and interpretation of laboratory findings. The authors cover the significance of specific symptoms. They go over the body as a whole—and examine each symptom and part of the body. Finally, they discuss and evaluate the findings of laboratory and special procedures.

The contents of METHODS OF DIAGNOSIS are based on more than twenty-five years of bedside teaching of physical diagnosis. The enjoyable and vivid Clendening style puts this book in class of thoughtful literature as well as scientific publication—both pleasantly readable and highly informative.

Order Form

THE C. V. MOSBY COMPANY
3207 Washington Blvd.
St. Louis 3, Missouri

Gentlemen: Please send me a copy of the new Clendening-Hashinger METHODS OF DIAGNOSIS, $12.50.

☐ Attached is my check ☐ Charge my account

Name_____

Address_____

Editor's Column

WHAT DO OUR READERS WANT OF THE JOURNAL?

WITH this issue, THE JOURNAL OF PEDIATRICS begins its sixteenth year. When it was started fifteen years ago, many told the Editor that there was no place nor need for another American pediatric journal and prophesied that it would not survive. They failed to realize the developments and progress that were taking place in pediatrics, both in medical practice and in medical education. These fifteen years have shown that there was a place for the JOURNAL, for it has attained a greater circulation and readership than any other pediatric journal in the world.

During these years, from an editorial standpoint, the JOURNAL has attempted to hold to a middle ground, so to speak, printing, on the one hand, some of the results of the research in our splendid American pediatric departments upon which progress ultimately depends, and, on the other, more popular clinical material of interest and value to the practicing pediatrician, who has little time for study and reading and who asks for something practical to help him in his daily work with children. At times it has been difficult to hold to a proper balance. From some the complaint has been that the JOURNAL was too "high brow," but from others has come the complaint that it was too "low brow." Sometimes we have been dissatisfied with this "straddle." Our own feeling is that the time has arrived when there is a need and place for two quite different types of American pediatric journals—one, highly scientific in character, presenting the results of research, part of which, while of value, has no direct bearing on pediatric practice, and the other, a journal of character and scope of particular interest and value to the man in practice. This latter we feel should be the ultimate direction which THE JOURNAL OF PEDIATRICS should take. Until a new type of scientific journal is established, the JOURNAL will continue, as in the past, to open its pages to the reporting of a certain amount of research studies. Despite the fact that today, as contrasted with fifteen years ago, many hundreds of young doctors have been trained and certified as pediatric specialists, only approximately 20 per cent of the children in the United States receive their medical care from pediatricians in private practice and in hospital and clinic work. Over one-half of the subscribers and readers of the JOURNAL are not pediatric specialists. The JOURNAL has a responsibility to these men and the children of America.

An astute colleague recently asked if the JOURNAL had ever made any effort to find out what its subscribers and readers wanted. We, rather shamefacedly, had to say no—that its editorial policies in the past had been determined by the editors and Editorial Board. In other words, the readers had to take what the Editorial Board decided to give them. It started us thinking, and this is the

THE JOURNAL OF PEDIATRICS

EDITOR

BORDEN S. VEEDER, M.D., 3720 Washington Blvd., St. Louis 8, Mo.

PUBLISHED BY THE C. V. MOSBY COMPANY, 3207 WASHINGTON BLVD.
ST. LOUIS 3, U. S. A.

Entered at the Post Office at St. Louis, Mo., as Second Class Matter.

Published Monthly, Subscriptions may begin at any time.

Editorial Communications

Original Communications.—Manuscripts for publication and correspondence relating to them should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo., U. S. A. Articles are accepted for publication upon the understanding that they are contributed solely to The Journal of Pediatrics.

Articles and Comments for the Department, The Social Aspects of Medicine.—All material for this section should be sent to Dr. Edwards A. Park, The Johns Hopkins Hospital, Baltimore 5, Md., U. S. A.

Manuscripts should be typewritten on one side of the paper only, with double spacing, and liberal margins. References should be placed at the end of the article and should include, in the order given, name of author, journal, volume, page and year; e.g., Smith: J. Pediat. 1: 10, 1932. Journal abbreviations as used in the publications of the American Medical Association should be followed. Illustrations accompanying manuscripts should be numbered, provided with suitable legends, and marked on margin or back with author's name. Articles accepted for publication are subject to editorial revision.

Neither the editors nor the publishers accept responsibility for the views and statements of authors as published in their "Original Communications."

Illustrations.—A reasonable number of half-tone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editor for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered only in India ink, or black typewriter ribbon (when the typewriter is used), as ordinary blue ink or colors will not reproduce. Only good photographic prints or drawings should be supplied for half-tone work.

Books for Review.—Only such books as are considered of interest and value to subscribers will be reviewed, and no published acknowledgment of books received will be made. These should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo.

Reprints.—Reprints of articles published among "Original Communications," must be ordered specifically, in separate communication to the publishers, The C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, U. S. A., who will send their schedule of prices. Individual reprints of an article must be obtained through the author.

Business Communications

Business Communications.—All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.

Subscription Rates.—Single copies, 75c. In the United States and other countries of the U. S. Postal Zone, $8.50 per year in advance. In Canada and other foreign countries $9.50.

Remittances.—Remittances for subscriptions should be made by check, draft, post-office or express money order, or registered letter, payable to the publishers, The C. V. Mosby Co.

Change of Address.—The publishers should be advised of change of subscriber's address about fifteen days before the date of issue, with both new and old addresses given.

Advertisements.—Only articles of known scientific value will be given space. Forms close tenth of month preceding date of issue. Advertising rates and page sizes on application.

What do we mean by *Pure Crystalline Vitamin D?*

WE mean that the vitamin D_3 added to Pet Milk is not only of crystalline purity but, that it is actually produced in the physical form of crystals. That is significant to physicians, because the vitamin could not be crystallized unless it were a pure substance.

Some other interesting facts about this new pure form of vitamin D:

1. One gram has a potency of over 40,000,000 U. S. P. units.

2. Ten micrograms per pint, an invisible amount, gives to Pet Milk its potency of 400 units per reconstituted quart.

3. Pure crystalline vitamin D_3 is tasteless and odorless.

4. It is free from any other forms of vitamin D and when added to Pet Milk it is free also from any oil other than the natural butterfat of milk.

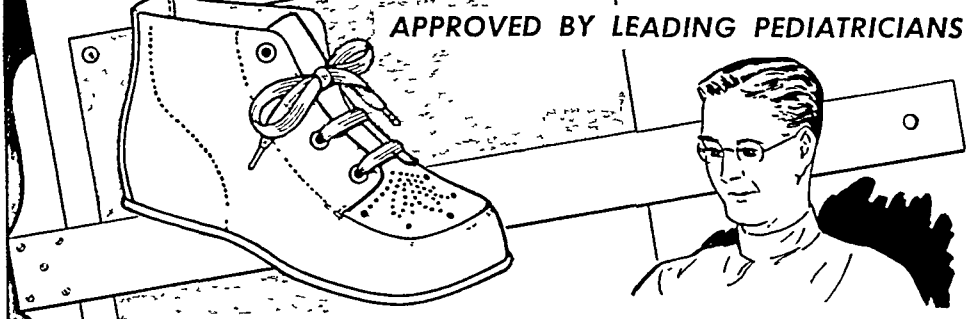
5. Consequently, its physiological effect is single and definite.

6. Being D_3, it is the same type of vitamin D that is created in the human skin by sunshine.

These are points of assurance to the physician of the effectiveness and tolerance by infants of the vitamin D in Pet Milk.

PET MILK COMPANY, 1437-G Arcade Bldg., St. Louis 1, Mo.





APPROVED BY LEADING PEDIATRICIANS

MORE THAN JUST A "CUTE" SHOE

SELF-STARTER SHOES offer more than just "good appearance." First of all, they are scientifically designed and constructed to give "Protected Foot Freedom" by providing proper cuboid, heel draft, height of upper, toe height, toe grasp, unusual flexibility which encourages equal development of the flexor and extensor muscles *plus* the ability to retain their normal shape under all conditions of wear

Self-Starters
FROM START TO SIX YEARS OLD

Write today for interesting leaflet and name of nearest experienced fitter

CARPENTER SHOE COMPANY, ROCHESTER, N. Y.

JUST ISSUED

BONE AND BONES

Fundamentals of Bone Biology

THE authors have written this volume in an effort to summarize and unify, and at the same time offer a detached survey of facts and theories which diminishes details but permits a vision of the greater plan.

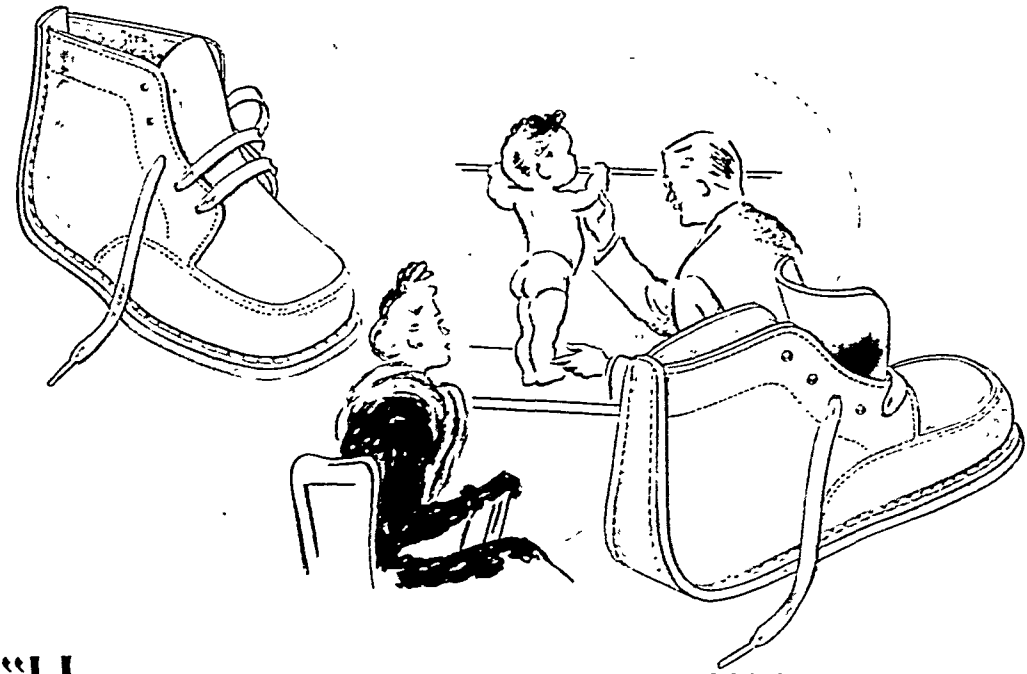
In the preface, they state, "The book is intended to be a challenge to the research worker; a guide to those who work on bone and on bones in their medical specialty: orthopedists, radiologists, metabolists, dentists, orthodontists; and an aid to the teacher who wants to integrate his particular field into the greater unit of biology."

A PATHOLOGIST AND AN ANATOMIST *each with a working knowledge of the other's field* HAVE JOINED FORCES TO CREATE THIS NEW AND UNUSUALLY VALUABLE WORK—

By JOSEPH P. WEINMANN, M.D., and HARRY SICHER, M.D. Department of Research, School of Dentistry, Loyola University, Chicago College of Dental Surgery

464 pages, with 289 illustrations. Price, cloth, $10.00.

The C. V. Mosby Company—Medical Publishers—St. Louis, U. S. A.



"His first walking shoes should hold those heel bones in correct position..."



JUMPING-JACKS DO THESE SIX THINGS:

1. Make the child walk straight by holding heel bones in correct position.
2. Prevent ankles from turning in or out.
3. Develop foot and leg muscles; no stiff counters or shanks.
4. Hold their shape until outgrown . . . no heel or striking edge to wear off.
5. Provide proper flexibility; it's like walking barefoot.
6. Encourage the child to step out confidently.

As you know, if a child learns to walk with those heel bones properly positioned, he learns to walk right. And that must happen when he wears Jumping-Jacks, for the exclusive, patented extension sole, running from the toe all the way up the heel to the shoe-top, makes him tread correctly and walk straight, with no turning of ankles in or out.

Yet Jumping-Jacks are soft shoes, giving full play to developing foot and leg muscles. They are quality shoes that hold their shape until outgrown. Recommend them with full confidence that their orthopedic features will meet your professional requirements, that their style and value will please parents.

JUMPING-JACKS
SOFT SHOES FOR HARD WEAR

Write for descriptive literature and name of nearest dealer.

S. B. VAISEY SHOE CO., INC.
625 SO. GOODMAN STREET • ROCHESTER 7, N. Y.

You Should Subscribe Now for These Special Journals

American Journal of Obstetrics and Gynecology

Representing The American Gynecological Society, The American Association of Obstetricians, Gynecologists and Abdominal Surgeons, and nine other societies. Editors: Geo. W. Kosmak, M.D.; Associate Editors: Howard C. Taylor, Jr., M.D., and Wm. J. Dieckmann, M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $12.00; Canada, and other Foreign Countries, $13.00 a year.

The Journal of Pediatrics

Borden S. Veeder, M.D., Editor.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

The Journal of Laboratory and Clinical Medicine

Official Publication of the Central Society for Clinical Research. Carl V. Moore, M.D., Editor. Board of Editors: Edgar V. Allen, M.D.; M. A. Blankenhorn, M.D.; George E. Burch, Jr., M.D.; Paul R. Cannon, M.D.; Jerome E. Conn, M.D.; Charles A. Doan, M.D.; Edgar S. Gordon, M.D.; Irvine H. Page, M.D.; Armand J. Quick, M.D.; Wesley W. Spink, M.D.; Cecil J. Watson, Ph.D., M.D.; Arnold D. Welch, Ph.D.; W. Barry Wood, Jr., M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

American Journal of Syphilis, Gonorrhea and Venereal Diseases

J. E. Moore, M.D., Editor, Frank W. Reynolds, M.D., Associate Editor. Advisory Editorial Board: A. M. Chesney, M.D.; C. W. Clarke, M.D.; R. D. Herrold, M.D.; E. L. Keyes, M.D.; P. A. O'Leary, M.D.; T. Parran, M.D.; P. S. Pelouze, M.D.; J. H. Stokes, M.D.; R. A. Vonderlehr, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

The Journal of Thoracic Surgery

Representing The American Association for Thoracic Surgery. E. A. Graham, M.D., Editor; Brian Blades, M.D., and Richard H. Mead, Jr., M.D., Associate Editors.

Advisory Editorial Board: John Alexander, M.D.; Edward Wm. Archibald, M.D.; Edward D. Churchill, M.D.; Leo Eloesser, M.D.; Stuart W. Harrington, M.D.; Howard Lilienthal, M.D.; Rudolph Matas, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $10.00, Canada, and other Foreign Countries, $10.50 a year.

American Heart Journal

A Journal for the study of circulation. Published monthly under the editorial direction of The American Heart Association. Editor-in-Chief, Thomas M. McMillan, M.D.; Associate Editors: Wallace M. Yater, M.D., Samuel Bellet, M.D., Louis Laplace, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $11.00 a year.

The Journal of Allergy

Official Organ of The American Academy of Allergy. H. L. Alexander, M.D., Editor. Editorial Board: M. M. Albert, M.D.; J. H. Black, M.D.; M. B. Cohen, M.D.; R. A. Cooke, M.D.; S. M. Feinberg, M.D.; S. B. Hooker, M.D.; F. C. Lowell, M.D.; F. M. Rackemann, M.D.; W. B. Sherman, M.D.; F. A. Simon, M.D.; M. B. Sulzberger, M.D.; L. Tuft, M.D.; M. Walzer, M.D.

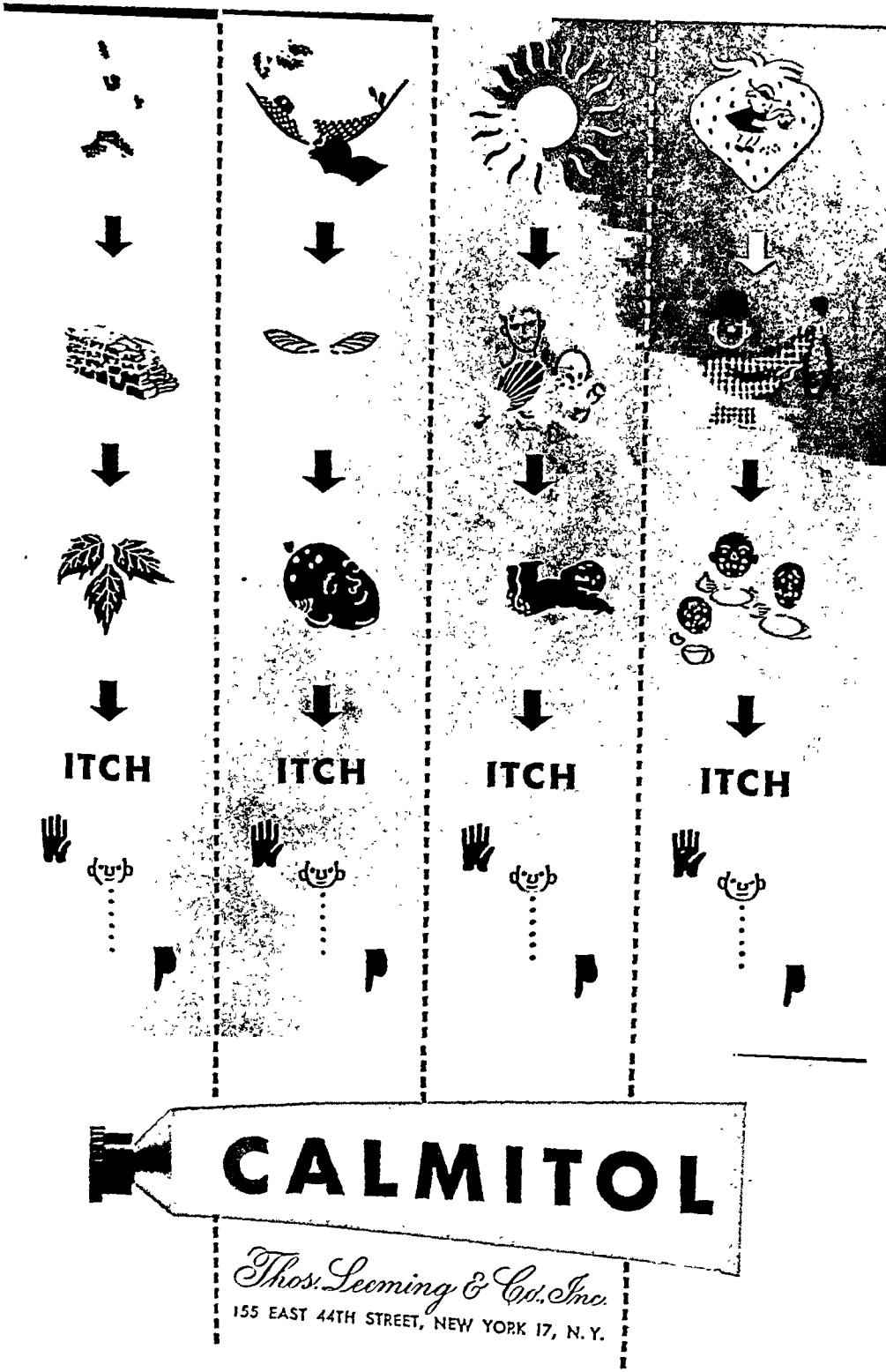
Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

Surgery

Alton Ochsner, M.D., and Owen H. Wangensteen, M.D., Editors. Alfred Blalock, M.D., Associate Editor. Published monthly. Subscription rates: Domestic, $10; Canada, and other Foreign Countries, $11 a year.

☞ Enter your subscriptions to these important special journals today. If you prefer we shall be glad to send a sample copy.

THE C. V. MOSBY COMPANY — *Publishers* — St. Louis


ITCH
ITCH
ITCH
ITCH
CALMITOL
Thos. Leeming & Co. Inc.
155 EAST 44TH STREET, NEW YORK 17, N. Y.



Ever wish you were Aladdin?

You remember him . . .

He was the lucky fellow who found a magic lamp. It gave him everything he wished for—from diamond-crusted palaces to a sultan's daughter as his bride.

You've probably wished a lot of times for a miracle like this to happen to you. Maybe not for out-of-this-world treasures, but for something that will take care of the things that are bound to come up.

Like medical expenses, or college for the kids. Or maybe just for the nice, safe feeling it gives you to have some extra money put aside for the future.

Though no magic is involved, there is a way to give you this security. The Payroll Savings Plan. Or, if you're not eligible for the Payroll Plan but have a checking account, the new Bond-a-Month Plan.

Either way, it's almost unbelievable how quickly your money accumulates.

Where else can you get such a *safe*, generous return on your money ($4 for every $3)? It's so simple—so easy, you hardly miss the money that you're saving.

And don't forget—at the same time, you're *making more*!

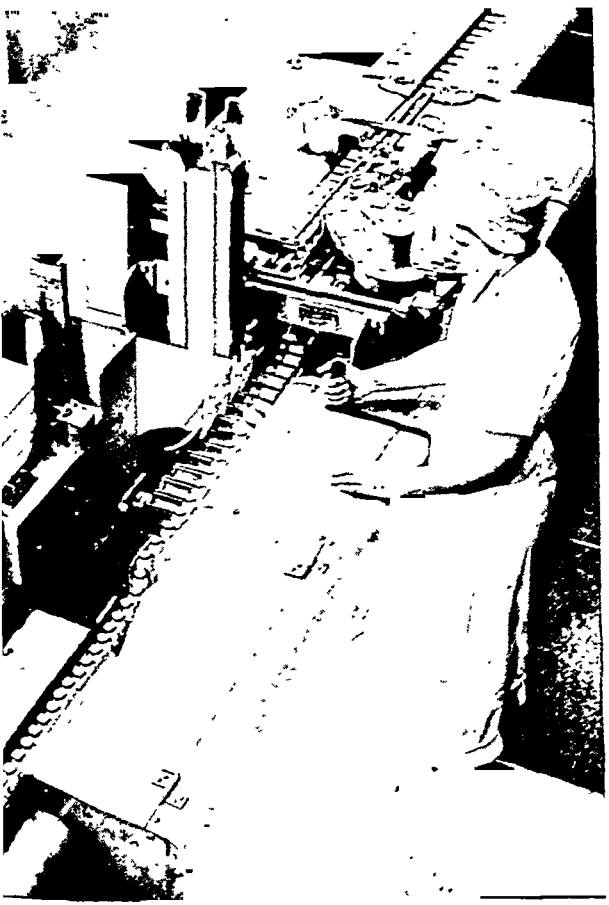
Next to a magic lamp, there's no better way than this to make sure your future is secure.

Save the easy, automatic way . . . with U.S. Savings Bonds

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.

STREPTOMYCIN

Highly Effective Antibacterial Agent



CLINICAL INDICATIONS

Streptomycin is effective in the treatment of:

URINARY TRACT INFECTIONS, BACTEREMIA, and MENINGITIS due to susceptible strains of the following organisms:

Esch. coli **A. aerogenes**
Proteus vulgaris **Ps. aeruginosa** (*B. pyocyaneus*)
Klebsiella pneumoniae (*Friedländer's bacillus*)

TULAREMIA

ALL *H. influenzae* INFECTIONS

Streptomycin is a helpful agent in the treatment of the following diseases, but its position has not been clearly defined:

Peritonitis due to susceptible organisms.

Pneumonia due to *Klebsiella pneumoniae* (*Friedländer's bacillus*).

Liver abscess due to streptomycin-sensitive, gram-negative bacilli.

Cholangitis due to streptomycin-sensitive, gram-negative bacilli.

Endocarditis caused by penicillin-resistant, streptomycin-sensitive organisms.

Tuberculosis.

Chronic pulmonary infections due predominantly to streptomycin-sensitive, gram-negative flora.

Empyema due to streptomycin-sensitive, gram-negative organisms.

★

Physicians now may obtain adequate supplies of this remarkable new antibacterial agent, without restriction, from their local pharmacists and hospitals.

STREPTOMYCIN
HYDROCHLORIDE
MERCK

Council Accepted

MERCK & CO., Inc. RAHWAY, N. J.
Manufacturing Chemists
In Canada: MERCK & CO., Ltd. Montreal, Que.

MERCK MERCK

Follows Good Diagnosis

ATLAS OF CARDIOVASCULAR DISEASES

A new book of value to general practitioner, students, teachers and specialists.

By IRVING J. TREIGER, M.D.
Clinical Assistant Professor of Medicine, University of Illinois; in charge of Cardiographic Department, Presbyterian Hospital; Consulting Cardiologist, Municipal Tuberculosis Sanitarium, Chicago.

177 pages, illustrated with 69 plates, containing 244 illustrations, 11 in color. 1st Edition. Price, $10.00.

"Regardless of how convincing one method of examination may be, the interpretation of it without correlation with other findings may lead to mistakes and failure of therapy." So states the author of this new volume in his Preface—and in the pages following, he correlates clinical electrocardiography and cardiac roentgenology with clinical history and autopsy findings.

A cross section of common types of heart disease with autopsy findings is presented. An endeavor was made to select a variety of cases with characteristic changes shown in the roentgenogram, electrocardiogram, and pathological specimen, emphasizing their clinical value. Only simple, uncomplicated cases are reviewed, since by visualizing elementary changes in uncomplicated cases, it is much easier to analyze complicated anatomical and physiological changes of a cardiac disease with more etiological factors.

CONTENTS

I. Normal Heart. Anatomy, Roentgenogram, Electrocardiogram.
II. Rheumatic Heart Disease: Mitral Stenosis. Aortic Insufficiency. Mixed Valvulitis. Myocarditis. Pericarditis. Active Carditis. Bacterial Endocarditis.
III. Arteriosclerotic Heart Disease: Arteriosclerosis of the Heart and Aorta. Coronary Sclerosis. Myocardial Infarct.
IV. Hypertension.
V. Syphilitic Heart Disease.
VI. Congenital Anomalies.
VII. Summary.

Now Ready!

ORDER NOW!

USE COUPON TO ORDER!

The C. V. MOSBY COMPANY M J
3207 Washington Blvd., St. Louis 3, Mo.

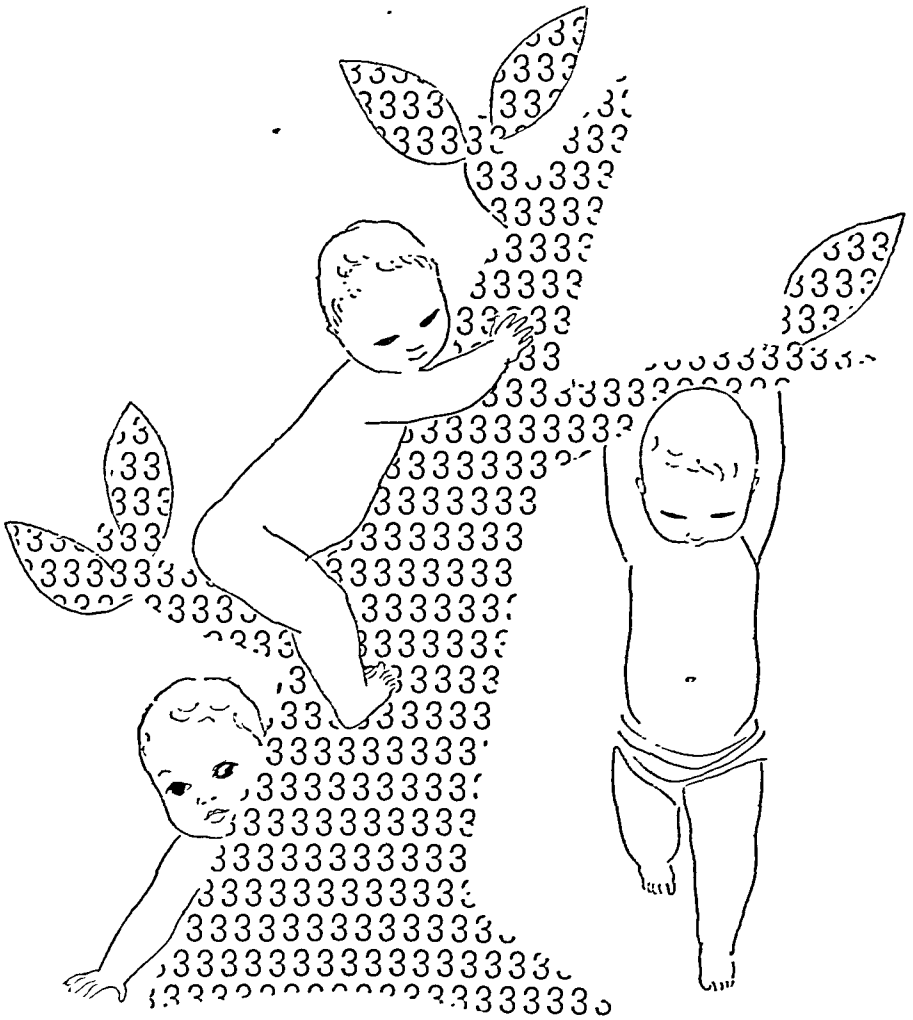
Gentlemen: Send me immediately a copy of

Treiger's ATLAS OF CARDIOVASCULAR DISEASES.
Price, $10.00

☐ Attached is my check. ☐ Charge my account.

Name ----------

Address ----------



babies grow on threes...

From infancy through late childhood, the average dose of Navitol with Viosterol is *only three drops daily.* This modern three-drop dose assures anti-rachitic protection for the normal child *throughout the active growth period.*

The maximum potencies of concentrated Oleovitamin A and D specified in U.S.P. XII —5,000 U.S.P. units of vitamin A and 1000 U.S.P. units of vitamin D—are supplied in three drops. So palatable, Navitol can be placed right on the baby's tongue, if desired. So nearly odorless, it is an instant hit with mothers. And economical! The three-drop dose costs only half a cent a day!

SQUIBB

Navitol
TRADE MARK
WITH VIOSTEROL

MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1853

BRIEF HISTORICAL NOTES ON MEAD'S CEREAL, PABLUM AND PABENA

HAND in hand with pediatric progress, the introduction of Mead's Cereal in 1930 marked a new concept in the function of cereals in the child's dietary. For 150 years before that, since the days of "pap" and "panada," there had been no noteworthy improvement in the nutritive quality of cereals for infant feeding. Cereals were fed principally for their carbohydrate content.

The formula of Mead's Cereal was designed to supplement the baby's diet in minerals and vitamins, especially iron and thiamine. How well it has succeeded in these functions may be seen from two examples:

(1) As little as one-sixth ounce of Mead's Cereal* supplies over 50% of the iron and 20% of the thiamine minimum requirements of the 3-months-old infant. (2) One-half ounce of Mead's Cereal furnishes all of the iron and 60% of the thiamine minimum requirements of the 6-months-old baby.

That the medical profession has recognized the importance of this contribution is indicated by the fact that cereal is now routinely included in the infant's diet as early as the third or fourth month instead of at the sixth to twelfth month as was the custom only a decade or two ago.

In 1933 Mead Johnson & Company went a step further, improving the Mead's Cereal mixture by a special process of cooking, which rendered it easily tolerated by the infant and at the same time did away with the need for prolonged cereal cooking in the home. The result is Pablum, an original product which offers all of the nutritional qualities of Mead's Cereal, plus the convenience of thorough scientific cooking.

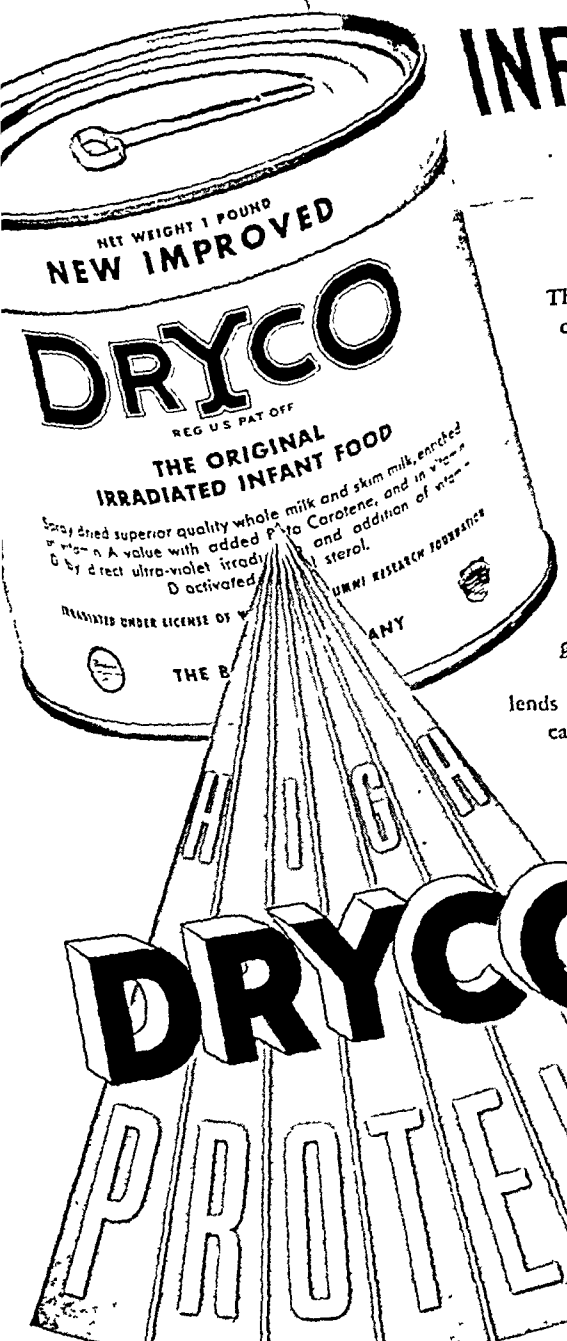
During the last twelve years, these products have been used in a great deal of clinical investigation of various aspects of nutrition, which have been reported in the scientific literature.

Many physicians recognize the pioneer efforts on the part of Mead Johnson & Company by specifying Mead's Cereal and PABLUM—and also the new Pablum-like oatmeal cereal known as PABENA.

*Pablum, the precooked form of Mead's Cereal, has practically the same composition: wheatmeal (farina), oatmeal, cornmeal, wheat embryo, beef bone, brewers yeast, alfalfa leaf, sodium chloride, and reduced iron.

Mead Johnson & Co., Evansville 21, Indiana, U. S. A.

THE HIGH-PROTEIN INFANT FOOD



The incidence of mild protein deficiencies in children, predisposing toward infections and edema, is reported[1,2] much greater than generally realized. Infant and adolescent requirements—not only for tissue repair and maintenance, but also for growth—are much higher than in adulthood.[3] To insure adequate protein intake in infancy, DRYCO—Borden's high-protein infant food—is ideally suited as a basis for formula building. It furnishes *all the essential amino acids*. Its low fat content minimizes gastro-intestinal upsets due to fat intolerance, while its intermediate carbohydrate content lends itself for prescription with or without added carbohydrate. Quickly soluble in cold or warm water, DRYCO contains adequate vitamins A, B_1, B_2 and D, plus essential milk minerals.

References 1 Dodd, K and Minot, A S *J Pediat*, 8 442, 1936.
2 Dodd, K and Minot, A S *J Pediat*, 8 452, 1936.
3 Sahyun, M *Am J. Dig Dis*, 13·59, 1946.

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 Madison Avenue, New York 17, N. Y.

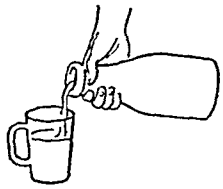
In Canada write The Borden Company, Limited Spadina Crescent, Toronto.

DRYCO is made from spray-dried, pasteurized, superior quality whole milk and skim milk. Provides 2500 U.S.P. units vitamin A and 400 U.S.P. units vitamin D per reconstituted quart. Supplies 31½ calories per tablespoon. Available at all drug stores in 1 and 2½ lb. cans.

ACCEPTED American Medical Association

The "Custom Formula" High Protein Infant Food

for those **sensitive** to the proteins in milk . . .







• When children (infants and adults, too) are unable to tolerate the animal proteins in cow's milk, MULL SOY—*the emulsified soy concentrate*—is the replacement of choice. It is highly palatable, and easily digestible, without the offending proteins of animal origin.

• MULL SOY is a biologically complete vegetable source of all essential amino acids In standard 1:1 dilution, it also provides the other important nutritional factors of fat, carbohydrate and minerals in quantities that closely approximate those of cow's milk.

• To prepare MULL SOY, simply dilute with equal parts of water.

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N Y
In Canada write The Borden Company, Limited, Spadina Crescent, Toronto

mull-Soy

MULL SOY is a liquid hypoallergenic food prepared from water, soy flour, soy oil dextrose sucrose, calcium phosphate calcium carbonate salt and soy lecithin homogenized and sterilized
Available in 15½ fl oz cans at drug stores everywhere



when milk becomes "forbidden food"

Announcing the availability of PERTUSSIS IMMUNE SERUM (human) IN VACUUM DRIED FORM

Once again we have Pertussis Immune Serum (human) in the preferred vacuum dried form. Orders from physicians anywhere filled quickly. 24-hour service to handle telegraph orders. For literature and full information, write to:

The PHILADELPHIA SERUM EXCHANGE

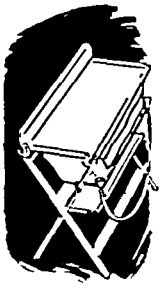
A NON-PROFIT ORGANIZATION

1740 Bainbridge Street
Philadelphia 46, Pa.

Help for new Mothers



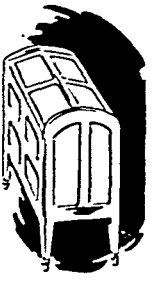
These three famous Trimble Nursery Necessities help mothers care for babies safely and with less effort.



KIDDIE-KOOP... the folding safety-screened crib for complete protection.

KIDDIE-BATH... makes baby bathing simple, safe.

KIDDIE-TRAINER ...makes sound toilet training so easy.



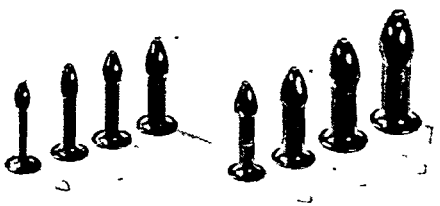


Complete new helpful booklet "Making the World Safe for Baby," free for distribution to mothers. Write to Trimble, 90 Wren St., Rochester 13, N.Y.

Trimble NURSERYLAND FURNITURE

In CONSTIPATION

YOUNG'S RECTAL DILATORS



CHILDREN'S	ADULT'S
4 graduated sizes 0, 1, 1½, and 2	4 graduated sizes 1, 2, 3 and 4

Used by the profession for more than 40 years, Young's Rectal Dilators provide anal dilatation and help to restore normal tone where tight or spastic rectal sphincter muscles have induced a constipated condition. 15 to 30 minutes' daily use tends to promote habit time. Sold only on R.

● Available at ethical drug stores or from your surgical supply house. Write today for complete literature.

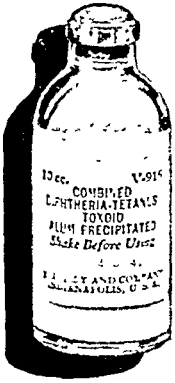
F. E. YOUNG & COMPANY

434 E. 75th St. Chicago 19, Ill.

simultaneous immunization



Clinical evidence indicates that the immunity produced by combined immunization against diphtheria and tetanus is at least as effective as that obtained with single immunization preparations. Combined vaccines have the added advantage of reducing the total number of injections required. Physicians now may virtually strike out two scourges of infancy and early childhood with a single preparation. Diphtheria Toxoid-Tetanus Toxoid Combined, Alum Precipitated, is available in packages containing two 1-cc. vials (1 immunization), and in 10-cc. vials (5 immunizations).

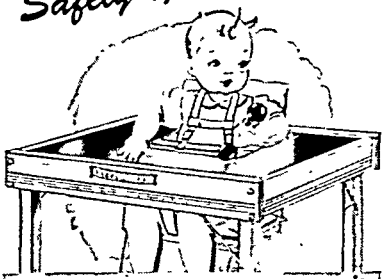


Diphtheria Toxoid, Alum Precipitated, or Tetanus Toxoid, Alum Precipitated, is available for stimulating doses.

ELI LILLY AND COMPANY
INDIANAPOLIS 6, INDIANA, U.S.A.

Vol. 31, No. 2, August, 1947. The Journal of Pediatrics is published Monthly by The C. V. Mosby Compa... ...vd., St. Louis 3, Mo. Subscription price: United States, its possessions, ... $8.50 a year; Canada, $10.00 (Canadian Currency); Foreign, $9.50. Entered ... r June 29, 1932, at the Post Office at St. Louis, Missouri, under the Act of March 3, 1879. Printed in the U. S. A.

YOU CAN *Safely Recommend*



BABEE-TENDA*
TUMBLE-PROOF *Safety Chair*

More than half a million Mothers, and doctors and nurses by the thousands have used Babee-Tenda for their own babies. Child authorities endorse its many unique patented safety and training features:

1. SAFE FROM FALLS



Low, sturdy, well balanced, 25" square, 22" high, prevents disastrous high-chair spills. Non-collapsible legs. Safety halter holds securely, permits ample squirming-room.

2. AIDS DEVELOPMENT

Patented, self-adjusting back, seat and footrest aid posture, help develop back, foot and leg muscles. Suspended swing-action seat (well above floor drafts) affords restful comfort.

3. PROMOTES GOOD FEEDING HABITS

Eases mother's job at feeding time; removes child from emotional distractions of family dinner table; encourages self-feeding at baby's own table.

Sold only through authorized agencies (not in stores). Write for illustrated folder and prices. *Reg. U. S. Pat. Off.

BABEE-TENDA
Safety First and Always

THE BABEE-TENDA CORPORATION
Dept. JP-2, 750 Prospect Ave., Cleveland 15, Ohio
In Canada: 347 Bay Street, Toronto 1, Ont.

See the improved Hygeia Nursing Unit

- Easy to clean.
- Fewer parts to handle—just bottle, nipple and cap.
- When bottles are filled, only necessary to remove cap at feeding time.
- Sterilized cap makes handy container for baby's other foods.

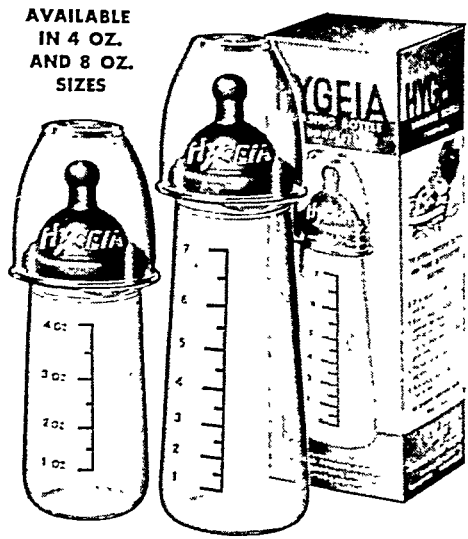
CAP . . . Keeps nipple germ-free for storing or out-of-home feeding. Sterilized cap may be used for orange juice, cereals, etc.

NIPPLE . . . Famous breast-shaped nipple has a patented airvent to insure steady flow of formula and reduce "wind-sucking." Sanitary tab keeps nipple sterile when applying. *Not necessary to touch feeding surfaces of nipple.*

BOTTLE . . . Wide mouth—easy to clean—no funnel required for filling. Red measuring scale easy to read. Tapered shape makes it easier for baby to hold.

Sample free to doctors on request.
Sold by druggists everywhere.
Hygeia Nursing Bottle Co., Inc.
1210 Main St., Buffalo 9, N. Y.

AVAILABLE IN 4 OZ. AND 8 OZ. SIZES



All Hygeia national ads say:
"CONSULT YOUR DOCTOR REGULARLY"

HYGEIA NURSING BOTTLES NIPPLES WITH CAPS
Sold complete as illustrated, or parts separately

The Role of Meats and Vegetables in Infant Nutrition

Excerpts from
"INFANT NUTRITION"
by P. C. Jeans, A.B., M.D. and Williams McKim Marriott, B.S., M.D.
4th Edition 1947, The C. V. Mosby Co., St. Louis

"VEGETABLES SUPPLEMENT the infant's diet moderately in various nutritional essentials, including iron and thiamine, the two materials in which the diet of the young infant is most likely to be deficient." (*page 225*)

"Meat appropriately prepared may be fed at any age. When well cooked and minutely divided, it is easily digested by the young infant . . . Several of the prepared baby soups . . . contain finely divided meat. Some of these are known as vegetable soups with cereal and meat; some preparations consist wholly of meat, together with the water of cooking and seasoning. The meats commonly available in such preparations are beef and lamb muscle meat and liver. The machine processing of muscle meat results in a more finely divided product than can be prepared conveniently in the home." (*page 229*)

"Many variants of the foods discussed, or combinations of those foods, may be used in the baby's diet . . . Soups may be prepared from vegetables, milk, and butter. Prepared baby soups of vegetables, cereal, and meat are commonly available." (*page 231*)



Here are the meat-and-vegetable foods a baby needs

Campbell's Baby Soups are combinations of vegetables, meat and cereal. They provide all the meat, all the vegetables a growing, happy baby requires, and may be prescribed as the main dish of a meal.

In texture—smooth semi-solids, easy for a baby to digest; and easy to take as the first solid foods. These soups may be fed as early as any strained foods.

Combination foods like these make it possible to feed a baby a scientifically balanced variety of meat-and-vegetable elements at an early age.

For chart showing ingredients and dietetic analysis of each soup, write: Campbell Soup Co., Camden, N. J.

5 KINDS:

CHICKEN	+	5 VEGETABLES	+	CEREAL
BEEF	+	6 VEGETABLES	+	CEREAL
LIVER	+	7 VEGETABLES	+	CEREAL
LAMB	+	5 VEGETABLES	+	CEREAL
VEGETABLE		8 VEGETABLES	+	OATMEAL

Every grocer who sells Campbell's Soups can supply Campbell's Baby Soups

Now Ready!

CANCER

DIAGNOSIS, TREATMENT, PROGNOSIS

LAUREN V. ACKERMAN, M.D.
Pathologist to the Ellis Fischel State Cancer Hospital; Assistant Professor of Pathology, Washington University School of Medicine, St. Louis

JUAN A. del REGATO, M.D.
Radiotherapist to the Ellis Fischel State Cancer Hospital; former assistant to the Radium Institute of the University of Paris.

This is a new book of major importance to the medical profession. Its subject is obviously significant—and the manner in which the authors present their information renders the book a necessary tool of practice for every physician, specialist and general practitioner alike.

Part One is composed of five chapters, the first introducing the general subject. The remaining four cover Cancer Research (by Dr. Shimkin of the National Research Institute for Cancer); Pathology; Surgery; and Radiotherapy. Representing attitudes on the subject matter, these chapters give an excellent working background.

Part Two takes up cancer of the various systems and organs of the body. Each chapter covers a separate system, and the chapters are set up logically under the following arrangement: Anatomy—and in this section the lymphatics are completely outlined and illustrated. So far as is known, this is the only complete presentation of the lymphatic system available, having been gathered from scattered sources. Then follow Pathology, Clinical Evolution of Tumors, Diagnosis, Differential Diagnosis, Treatment and Prognosis.

1200 pages, 749 illustrations, 42 in color on nine plates. Price, $20.00

THE C. V. MOSBY COMPANY
3207 Washington Blvd.
St. Louis 3, Mo.

M.J.

Gentlemen: Reserve my copy of Ackerman and Regato's new book,

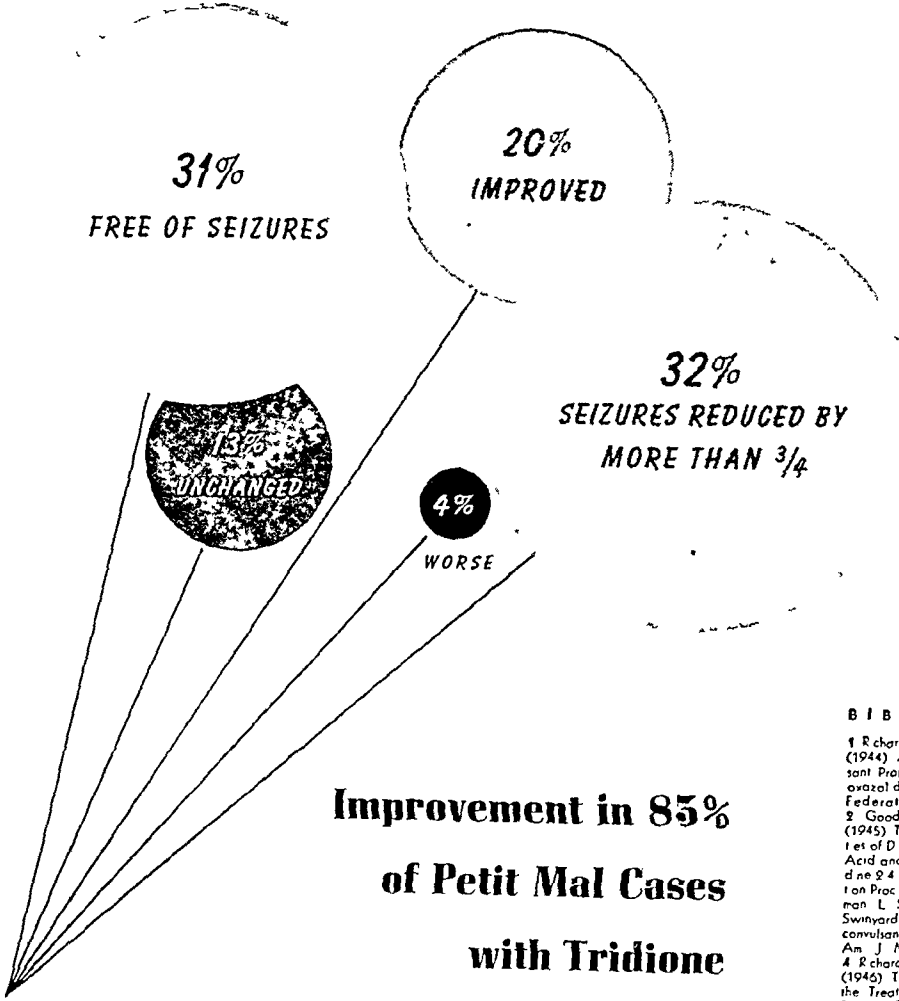
CANCER—DIAGNOSIS, TREATMENT, PROGNOSIS

☐ Attached is my check for $20.00

☐ Charge my account.

Name ----------

Address ----------



Improvement in 85% of Petit Mal Cases with Tridione

Here's new evidence that Tridione is effective in petit mal. A recent study showed that it brought decided improvement in 83% of the patients to whom it was administered.[13] In this study, Tridione was given to 166 patients suffering from petit mal (pykno-epilepsy), myoclonic jerks or akinetic seizures. This group, as a whole, had received *little or no benefit from other medicaments*. With Tridione, 31% became free of seizures; 32% had fewer than one-fourth of the previous number of seizures; 20% improved to a lesser extent; 13% remained unchanged, and only 1% became worse. *Thus 83% showed improvement.* ● Furthermore, in some cases the seizures *did not return* when Tridione was discontinued. Studies also showed that Tridione was beneficial in certain psychomotor cases when given in conjunction with other antiepileptic drugs.[12] Prescription pharmacies everywhere stock Tridione in 0.3-Gm. capsules or in pleasant-tasting aqueous solution containing 0.15 Gm. per fluidrachm. May we send latest Tridione literature?

Abbott

(Trimethadione, Abbott) **Tridione**®

ABBOTT LABORATORIES • NORTH CHICAGO, ILLINOIS

BIBLIOGRAPHY

1 Richards R K and Everett G M (1944) Analgesic and Anticonvulsant Properties of 3 5 5 Trimethyloxazolidine 2 4 dione (Tridione) Federation Proc 3 39 March 2 Goodman L and Manuel C (1945) The Anticonvulsant Properties of D methyl N methyl Barbituric Acid and 3 5 5 Trimethyloxazolidine 2 4 dione (Tridione) Federation Proc 4 119 Mar 3 Goodman L S Toman J E P and Swinyard E A (1946) The Anticonvulsant Properties of Tridione Am J Med 1 213 September 4 Richards R K Peristein M A (1946) Tridione a New Drug for the Treatment of Convulsive and Related Disorders Arch Neurol and Psych at 55 164 February 5 Lennox W G (1945) The Treatment of Epilepsy Med Clin North America 29 1114 September 6 Thorne F C (1945) The Anticonvulsant Action of Tridione Preliminary Report Psychiatric Quart 19 686 Oct 7 Lennox W G (1945) Petit Mal Epilepsies Their Treatment with Tridione J Amer Med Assn 129 1069 Dec 15 8 Lennox W G (1946) Newer Agents in the Treatment of Epilepsy J Ped at 29 356 Sept 9 De Jong R N (1946) Effect of Tridione in Control of Psychomotor Attacks J Amer Med Assn 130 565 Mar 2 10 Peristein M A and Andelman M B (1946) Tridione Its Use in Convulsive and Related Disorders J Ped at 29 20 July 11 Lennox W G (1946) Two New Drugs in Epilepsy Therapy Am J Psychiat 103 159 Sept 12 De Jong R N (1946) Further Observations on the Use of Tridione in the Control of Psychomotor Attacks Am J Psychiat 103 162 Sept 13 Lennox W G (1947) Tridione in the Treatment of Epilepsy J Amer Med Assn 134 138 May 10 14 Rickles N K and Polan C G (1947) Tridione Its Use in the Treatment of Epilepsy and other Neurologic Disorders Northwest Med 46 375 May

INDEX TO ADVERTISERS

Please mention "The Journal of Pediatrics" when writing to our advertisers—It identifies you

Abbott Laboratories (Vi-Daylin) ---- 4
American Meat Institute (Meats) ---- 26
American Sterilizer Company (Milk Formula Laboratory Service) ---- 32
Arlington Chemical Company, The (Neo-Cultol) ---- 10
Armstrong Company, The Gordon (Baby Incubator) ---- 3
Articles to Appear in Early Issues ---- 54
Averst, McKenna & Harrison Limited (Beminal) ---- 27

Babee-Tenda Corporation, The (Tumble-Proof Safety Chair) ---- 65
Borden's Prescription Products (Dryco) ---- 61
Borden's Prescription Products (Mull-Soy) ---- Fourth Cover
Breck, Inc., John H (Baby Breck Ointment) ---- 49
Bristol Laboratories Inc (Penicillin) ---- 28
Burroughs Wellcome & Co (U S A) Inc (Dexin) ---- 43
Burroughs Wellcome & Co (U S A) Inc Ryzamin-B) ---- 56

Campbell Soup Company (Baby Soups) ---- 2
Carnation Company (Evaporated Milk) ---- 24
Carpenter Shoe Company (Self-Starters) ---- 62
Cereal Institute, Inc (Cereals) ---- 22
Clapp's Baby Cereals (Cereals) ---- 19
Commercial Solvents Corporation (Penicillin Troches) ---- 40
Corn Products Sales Company (Karo) ---- 30
Cream of Wheat Corporation, The (Enriched 5 Minute Cream of Wheat) ---- 14
Cutter Laboratories (Diphtheria-Pertussin-Tetanus Combined Vaccine) ---- 52

Davol Rubber Company (Anti-Colic Brand Nipple) ---- 9
Doho Chemical Corporation (Auralgan and Otosmosan) ---- 31
Donley-Evans & Company (Gluco-Sulfonamides) ---- 11

Gerber Products Company (Baby Foods) ---- 25
Glidden & Co., Inc Otis E (Zymenol) ---- 17
Great Atlantic and Pacific Tea Company, The (White House Evaporated Milk) ---- 29

Heinz Company, H J (Strained Peas) ---- 28
Hoffmann-La Roche, Inc (Cal C-Tose) ---- 57
Hygeia Nursing Bottle Co., Inc (Nursing Unit) ---- 65

International Pharmaceutical Corporation (Glycerite of Hydrogen Peroxide) ---- 23

Johnson & Johnson (Baby Lotion) ---- 5
Junket Folks, The (Rennet) ---- 15

Kinney & Sons, Inc., H. W. (Cartose) ---- 50

Lederle Laboratories, Inc. (Cerevim) ---- 33
Leeming & Co., Inc., Thos (Calmitol) ---- 55
Libby, McNeill & Libby (Homogenized Baby Foods) ---- 42
Lilly and Company, Eli (Pectocel) ---- Second Cover

M & R Dietetic Laboratories, Inc (Similac) 6
Marcelle Cosmetics, Inc (Hypo-Allergenic Cosmetics) ---- 36
Mead Johnson & Company (Dextri-Maltose) ---- 1
Mead Johnson & Company (Pabena and Pablum) ---- 70
Merck & Co., Inc (Streptomycin) ---- 57
Merrell Company, The Wm S (Infa-Concemin) ---- 35

National Dairy Products, Inc (Formulac) 45
Nepera Chemical Co., Inc (Mandelamine) 16
Nestlé's Milk Products, Inc (Evaporated Milk) ---- 41

Parke, Davis & Company (Benadryl Hydrochloride) ---- 7
Pet Milk Company (Evaporated Milk) ---- 51
Philadelphia Serum Exchange, The (Pertussin Immune Serum—Human) ---- 63

Ralston Purina Company (Ralston) ---- 34
Rare Chemicals, Inc (Dermolate and Acidolate) ---- 44
Robins Company, Inc., A H (Allbee) ---- 48

Schenley Laboratories, Inc (Penicillin) ---- 21
Smith, Kline & French Laboratories (Pragmatar) ---- 46
Squibb & Sons, E R (Navitol) ---- 59
Staley Mfg Co., A E (Sweetose) ---- 8
Stearns & Company, Frederick (Appella) ---- 13
Swift & Company (Strained and Diced Meats) ---- 47

Trimble (Nursery land Furniture) ---- 63

U S Savings Bonds ---- 66

Vaisey Shoe Co., Inc., S B (Jumping-Jacks) ---- 53

Wander Company, The (Ovaltine) ---- 39
Westwood Pharmacal Corp (Lowila) ---- 18
Winthrop Chemical Company, Inc (Drisdol) ---- 12
Wyeth Incorporated (Paba) ---- 20

Young & Co., F. E (Dilators) ---- 63

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.

CURD TENSION

Consistently Zero!



A CLINICAL ADVANTAGE IN FEEDING THE PREMATURE

Because Similac, like breast milk, has a *consistently zero* curd tension, it can be fed in a concentrated high-caloric formula without fear of increased curd tension and lengthened digestive period. Hence, premature infants unable to take a normal volume of food may safely be fed a concentrated Similac formula supplying as much as *double* the caloric value (per ounce) of the normal dilution. The use of a concentrated formula often avoids serious loss of weight and inanition in the premature infant, and permits a more rapid return to normal weight gain.

M & R DIETETIC LABORATORIES, INC. • COLUMBUS 16, OHIO

SIMILAC

Similar to breast milk

ACCEPTED AMERICAN MEDICAL ASSN.

A powdered, modified milk *product*, especially prepared for *infant feeding*, made from tuberculin tested cow's *milk* (casein modified) from which part of the butter fat has been removed and to which has been added *lactose*, cocoanut oil, cocoa butter, corn oil, and olive oil. Each quart of normal dilution Similac contains approximately 400 U S P units of Vitamin D and 2,000 U S P units of Vitamin A as a result of the addition of fish liver oil concentrates

CONTENTS FOR JULY, 1947

Original Communications

Rocky Mountain Spotted Fever: A Preliminary Report on the Use of Para-Aminobenzoic Acid. Clifford J. Tichenor, M.D., Lieutenant Sidney Ross (j.g.), Medical Corps, United States Naval Reserve, and Preston A. McLendon, M.D., Washington, D. C. ---------- 1

The Effect of Trimethyloxazolidine Dione (Tridione) on the Blood. Jean P. Davis, M.D., and William G. Lennox, M.D., Boston, Mass. 24

Psychological Considerations in a Group of Children With Poliomyelitis. Edith Meyer, Ph.D., Boston, Mass. ---------- 34

A Note on Experiences With a Rooming-in Arrangement for Newborn Infants in a Small Hospital. Henry L. Barnett, M.D., New York, N. Y. ---------- 49

The Blalock-Taussig Operation. George W. Salmon, M.D., and Howard T. Barkley, M.D., Houston, Texas ---------- 54

Homologous Serum Hepatitis Following Transfusion in an Infant. Lieutenant Henry B. Bruyn (j.g.), Medical Corps, United States Naval Reserve (Inactive), Berkeley, Calif. ---------- 60

Case Reports

Streptomycin in the Treatment of Miliary Tuberculosis. George Cobley, M.D., and Elvira Goettsch, M.D., Los Angeles, Calif. ---------- 70

Cholecystitis and Cholelithiasis in a Congenital Diverticulum of the Gall Bladder in a Three-Year-Old Boy. Frances H. Bogatko, M.D., and Julia Mehlman, M.D., New York, N. Y. ---------- 75

Periarteritis Nodosa in Childhood. Elizabeth J. Bradley, M.D., San Francisco, Calif. ---------- 78

Medical Care

The Treatment of Acute Poliomyelitis Together With Some Suggestions on Diagnosis. Philip M. Stimson, M.D., New York, N. Y. 82

Clinical Conference

Conference at the St. Louis Children's Hospital, May 23, 1947. Dr. Alexis F. Hartmann, Chief of Staff

Case 1. Adenoma of the Adrenal Cortex ---------- 93

Case 2. Histoplasmosis ---------- 98

Case 3. Chronic Lymphatic Leucemia ---------- 103

Case 4. Uveitis ---------- 105

Case 5. Tracheo-esophageal Fistula ---------- 110

Case 6. Tracheo-esophageal Fistula ---------- 111

The Social Aspects of Medicine

The Social Aspects of Medicine: A Statement. Joseph Palma, M.D., F.A.A.P. ---------- 117

An Open Letter to Dr. Palma. Park J. White, M.D., St. Louis, Mo. -- 118

The Group Health Cooperative of Puget Sound. William A MacColl, M.D., ---------- 119

News and Notes

News and Notes ---------- 124

Book Reviews

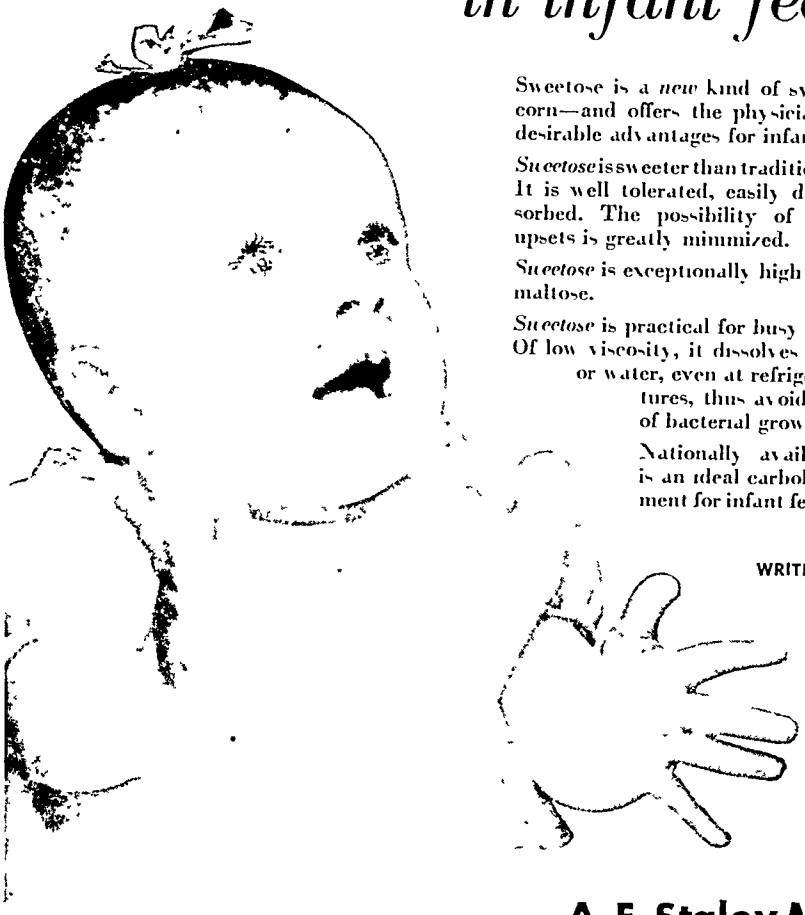
Book Reviews ---------- 127

Editor's Column

What Do Our Readers Want of the Journal? ---------- 129

Sweetose*

A new step forward in infant feeding



Sweetose is a *new* kind of syrup made from corn—and offers the physician a number of desirable advantages for infant feeding:

Sweetose is sweeter than traditional corn syrups. It is well tolerated, easily digested and absorbed. The possibility of gastrointestinal upsets is greatly minimized.

Sweetose is exceptionally high in dextrose and maltose.

Sweetose is practical for busy mothers to use. Of low viscosity, it dissolves rapidly in milk or water, even at refrigerator temperatures, thus avoiding stimulation of bacterial growth.

Nationally available, Sweetose is an ideal carbohydrate supplement for infant feeding formulas.

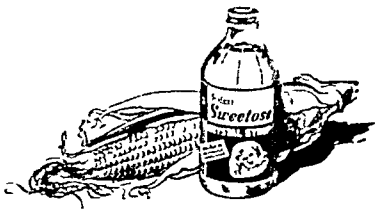
WRITE FOR FURTHER DETAILS

A. E. Staley Mfg. Co.

Box 1091, Decatur, Illinois

	Representative Analysis of Sweetose White Syrup	Representative Analysis of Ordinary Corn Syrup
Moisture	25.2	26.6
Dextrose	28.0	14.7
Maltose	25.5	13.9
Higher Sugars	12.0	13.6
Dextrines	9.1	24.8
Sucrose	0.0	6.2
Ash	0.2	0.2
Available Carbohydrates	74.6	73.2
Calories per fluid oz.	120.0	118.5

No added flavoring or salt.



* "Sweetose" is a trade-mark of the A. E. Staley Mfg. Co., Decatur, Illinois, registered in the U. S. Patent Office

Vol. 31 AUGUST, 1947 No. 2

THE JOURNAL OF PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE PROBLEMS AND DISEASES OF INFANCY AND CHILDHOOD

BORDEN S. VEEDER
St. Louis
Editor

Published by THE C. V. MOSBY COMPANY, 3207 Washington Blvd., St. Louis 3, U.S.A.
Copyright 1947 By The C. V. Mosby Company

Table of Contents on 3rd Cover

ARLCAPS* now available in 2 forms—for TANDEM ACTION



ARLCAPS, long a prescription favorite for securing rapid symptomatic relief of hay fever and asthma, is now presented in two forms:

ARLCAPS — **ARLCAPS**
BRAND OF PHENEPHATRATE

Uncoated

For rapid effectiveness; provides gratifying quick relief when needed.

Enteric Coated

For delayed action; prolongs symptomatic relief afforded by the uncoated capsule.

Combined for Tandem Action

Night-long benefit may be secured by simultaneous ingestion of 1 capsule and 1 enteric-coated tablet—the effects of the enteric-coated tablet becoming manifest during the night, thus extending the relief afforded by the capsule.

Both types supplied: 3-grain size—in bottles of 35 and 500; 5-grain size—in bottles of 25 and 500.

*The word ARLCAPS is a registered trademark of The Arlington Chemical Company.

Arlington THE ARLINGTON CHEMICAL COMPANY • YONKERS 1, NEW YORK



In response to requests from pediatricians, we are now also marketing PABENA—precooked oatmeal, enriched with vitamin and mineral supplements. PABENA closely resembles Pablum in nutritional qualities, and offers the same features of thorough cooking, convenience and economy. Supplied in 8-ounce cartons. Samples on request.

MEAD JOHNSON & COMPANY, EVANSVILLE, IND., U.S.A.

Why do Sally, Irene and Mary need vitamin D ?

Growing children require vitamin D mainly to prevent rickets. They also need vitamin D, though to a lesser degree, to insure optimal development of muscles and other soft tissues containing considerable amounts of phosphorus . . .

Milk is the logical menstruum for administering vitamin D to growing children, as well as to infants, pregnant women and lactating mothers. This suggests the use of Drisdol in Propylene Glycol, which diffuses uniformly in milk, fruit juices and other fluids.

Average daily dose for infants 2 drops, for children and adults 4 to 6 drops, in milk. Available in bottles of 5, 10 and 50 cc. with special dropper delivering 250 U.S.P. units per drop.



DRISDOL IN PROPYLENE GLYCOL

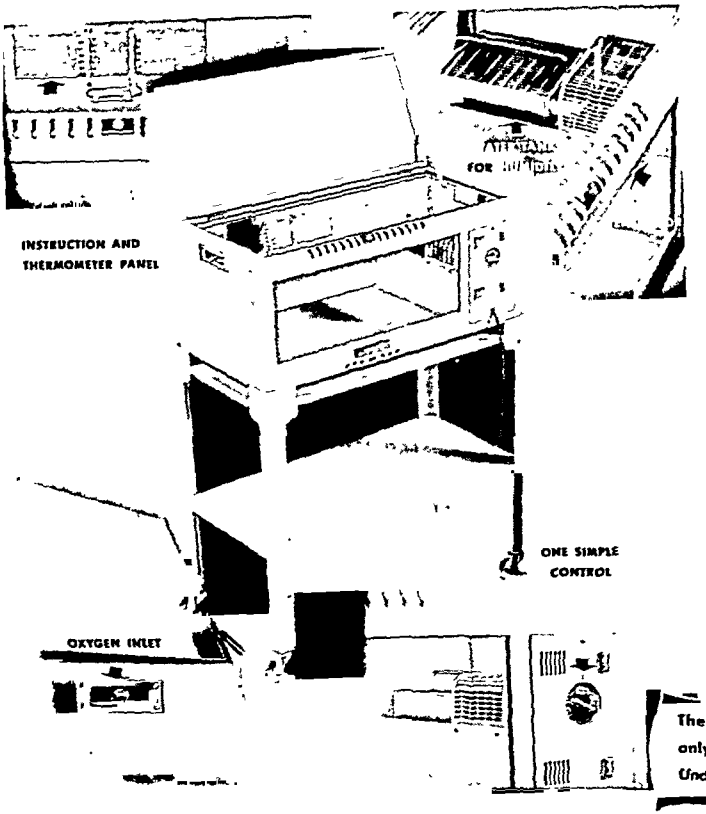
MILK DIFFUSIBLE VITAMIN D PREPARATION
ODORLESS • TASTELESS • ECONOMICAL

DRISDOL, trademark Reg U S Pat Off & Canada, Brand of Crystalline Vitamin D_2 (calciferol) from ergosterol

Winthrop CHEMICAL COMPANY, INC.

Pharmaceuticals of merit for the physician • New York 13, N. Y. • Windsor, Ont.

ARMSTRONG X-4 PORTABLE BABY INCUBATOR



1. Low cost
2. Underwriter approved
3. Simple to operate
4. Only 1 control dial
5. Safe, low-cost, heat
6. Easy to clean
7. Quiet and easy to move
8. Ball-bearing, soft rubber casters
9. Fireproof construction
10. Excellent oxygen tent
11. Welded steel construction
12. 3-ply safety glass
13. Full length view of baby
14. Simple outside oxygen connection
15. Night light over control
16. Both F. and C. thermometer scales
17. Safe locking ventilator
18. Low operating cost
19. Automatic control
20. No special service parts
21. Lid locks open

The Armstrong X-4 Baby Incubator is the only Baby Incubator tested and approved by Underwriters' Laboratories for use with oxygen.

● In offering you the Armstrong X-4 Portable Baby Incubator we stand firmly on the principle that we must provide a SAFE Baby Incubator, a LOW COST Baby Incubator and a SIMPLE Baby Incubator.

That we have succeeded is evidenced by the fact that to date close to 400 Hospitals have placed voluntary repeat orders for more than 1200 additional Incubators. More and more it is being used, not only for the premature baby, but for any debilitated or under weight baby.

THE GORDON ARMSTRONG COMPANY

Division PPI • Bulkley Building • Cleveland 15, Ohio

Distributed in Canada by INGRAM & BELL, LTD. • TORONTO • MONTREAL • WINNIPEG • CALGARY • VANCOUVER

Export Distribution by GENERAL ELECTRIC MEDICAL PRODUCTS CO. • CHICAGO 3, ILLINOIS



3 Major Hospitals Report NEW LOW in incidence of Impetigo!

Establishment of new methods of procedure—including introduction of the Mennen Antiseptic Baby Oil technique—was directly responsible for a drop in the incidence of impetigo cases among newborn babies in three major hospitals from 7.8% to 0.47%.

While impetigo cases *dropped* from 529 to 55 in these major hospitals, births *increased* from 6,752 to 11,707.

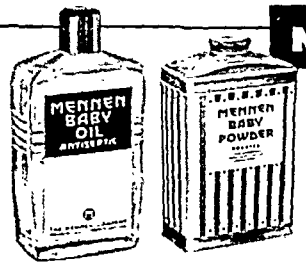
Extensive clinical studies prove that daily use of Mennen Antiseptic Baby Oil aids in providing a shield of antiseptic protection to infant skin. This antiseptic oil is an important factor in curbing impetigo, pustular rashes, miliaria, excoriated buttocks and diaper rash. Hospital staffs were also delighted with the discovery that Mennen Antiseptic Baby Oil WILL NOT STAIN HOSPITAL LINEN!

Results of clinical studies of Impetigo in 3 major hospitals

	BABIES	IMPETIGO
HOSPITAL "A"		
11 months before Mennen Antiseptic Baby Oil	2193	125 CASES
10 months since Mennen Antiseptic Baby Oil	2063	4 CASES
	BABIES	IMPETIGO
HOSPITAL "B"		
6 months before Mennen Antiseptic Baby Oil	272	54 CASES
16 months since Mennen Antiseptic Baby Oil	922	8 CASES
	BABIES	IMPETIGO
HOSPITAL "C"		
18 months before Mennen Antiseptic Baby Oil	4287	350 CASES
29 months since Mennen Antiseptic Baby Oil	8722	43 CASES

Mennen

Baby Oil.. Baby Powder



NEW

WHITER color
SOFTER texture
FRESHER scent

The Mennen Company offers you a new, better baby powder. Mothers voted it a 3 to 1 favorite for its whiter color, fresher scent and softer texture.

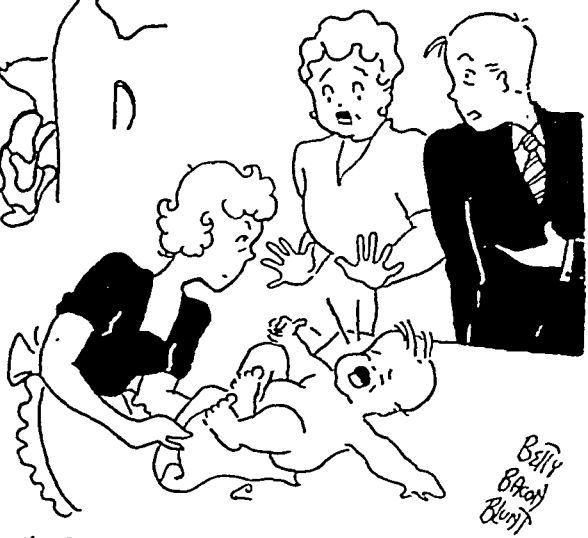
The New Baby Powder by Mennen
...the First Name in Baby Powder

No. 19: BELEAGURED MRS. BEYER



Oh, that housing shortage! Mrs. Beyer is lucky that her in-laws have a spare room. Works fine till the new baby arrives . . . then, trouble!

Good-by to peace and quiet! Baby wails by night . . . and Mrs. B. can hear Grandpa turning, in the next room. Baby frets by day . . . and Grandma comes running.



Mrs. Beyer is too new a mother to suspect that chafes and prickles might have something to do with baby's vocal tendencies (*not* inherited bad temper, from *her* side of the family).



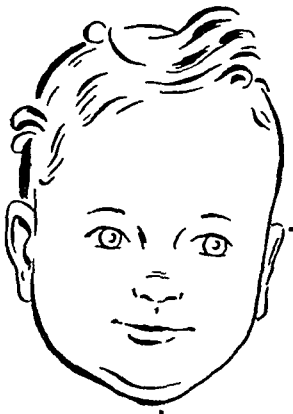
It's the baby's doctor who finally restores peace. He advises frequent dustings with soft, pure Johnson's Baby Powder . . . to help chase those uncomfortable little irritations.

More doctors and nurses recommend Johnson's than all other brands of baby powder put together.



JOHNSON'S BABY POWDER

Johnson & Johnson



Infants and Children

both respond to its delicious flavor



The appealing taste of Malt-o-Meal quickly wins infants and children. They readily accept and enjoy this distinctive cereal. Resistance to cereal feedings is rarely encountered when Malt-o-Meal is offered.

Malt-o-Meal is an enriched farinaceous wheat cereal, flavored with bits of toasted malt. It quickly cooks to creamy consistency and easy digestibility, and imposes no undue burden on the intestinal tract. Malt-o-Meal is bland, mechanically as well as chemically, and is residue-free (fiber content 0.4%).

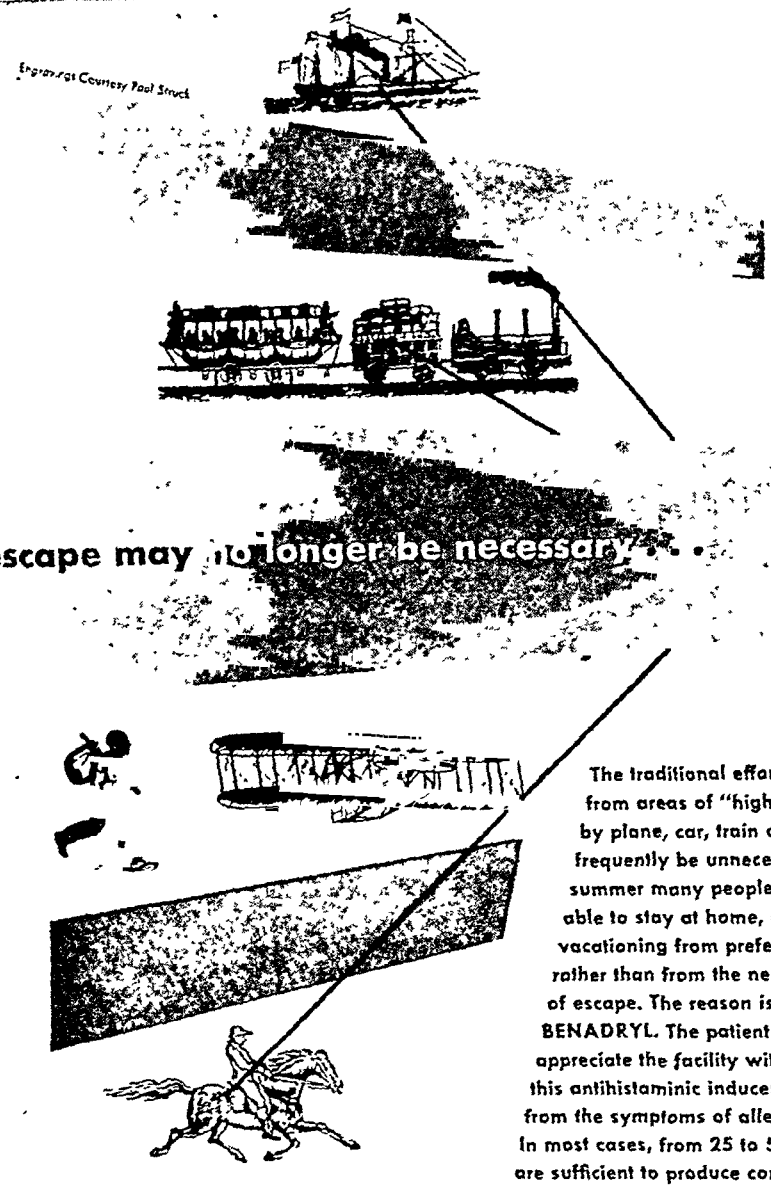
In addition to the basic nutrient content of wheat, Malt-o-Meal provides significant amounts of thiamine, riboflavin, niacin, and iron. Thus it makes a worth-while contribution toward the satisfaction of many nutritional requirements.

CAMPBELL CEREAL COMPANY, Minneapolis, Minn.

Malt-o-Meal



Malt-o-Meal, an enriched wheat cereal flavored with toasted malt, provides per ounce (dry weight), 0.29 mg of thiamine, 0.13 mg of riboflavin, 1.09 mg of niacin, and 2.00 mg of iron. Thus Malt-o-Meal provides appreciably



escape may no longer be necessary . . .

The traditional efforts to escape from areas of "high pollen count" by plane, car, train or ship may frequently be unnecessary. This summer many people will be able to stay at home, or go vacationing from preference rather than from the necessity of escape. The reason is BENADRYL. The patient will appreciate the facility with which this antihistaminic induces relief from the symptoms of allergy. In most cases, from 25 to 50 mg. are sufficient to produce complete symptomatic relief.

BENADRYL (diphenhydramine hydrochloride) is available in Kapseals® of 50 mg. each, in capsules of 25 mg. each, and as a palatable elixir containing 10 mg. in each teaspoonful.

PARKE, DAVIS & COMPANY, DETROIT 32, MICHIGAN

In INFANTILE ECZEMAS and DIAPER RASH

When Baby cannot tolerate

SOAP



LOWILA

for DIAPER RASH and Infantile Eczema due to or aggravated by soap

COMPLETELY SOAPLESS, NON-IRRITANT EFFICIENT SKIN CLEANSING

LoWILA* Cake

Superbly mild, lathering detergent; no alkali; correct pH; less slippery, therefore, allows firmer hold on baby in bath. NEW 6-oz. cake more convenient, more economical.

ADVERTISED IN AMERICAN MEDICAL ASSOCIATION PUBLICATIONS

LoWILA Liquid

Washes diapers beautifully, gently, without the irritating residue left by soaps. Very economical.

Mother's skin, too, will appreciate **LoWILA**

*T.M. Reg. U.S. Pat. Off.

WRITE FOR SAMPLE AND LITERATURE

Westwood PHARMACAL CORP.

468 DEWITT ST., BUFFALO 13, N.Y.



The WHYS *of* Beech-Nut Flavor

Because only the finest materials are used

Only the very best fruits, vegetables and meats are selected by Beech-Nut. An extensive agricultural program includes supervision of the growing and harvesting of fruits and vegetables and experimental efforts to produce foods with higher vitamin and mineral content.

Because of careful preparation

All cooking is done in closed cookers in the absence of air. Finished foods are quickly packed in glass jars and vacuum sealed. This assures high retention of natural flavor and natural food values.

Because uniform quality is assured

A modern test kitchen within the plant and fully equipped and staffed biological and quality-control laboratories constantly guard the quality of both raw materials and finished foods.



PACKED IN GLASS

A most important fact to remember when you recommend baby foods to mothers

Beech-Nut

STRAINED & JUNIOR

Foods *for* Babies

In many varieties of vegetables, meat combinations, soups, desserts and fruits.



Illustration from "Treatment of Common Skin Diseases" by Herman Goodman, M. D. (c) Froben Press, Inc., New York

ALLERGY OR DEFICIENCY?

Infantile eczema may be due to allergy. But it may also be due to deficiency of an essential unsaturated fatty acid.

The infant on a cow's milk formula gets only one-fifth as much n-linoleic acid as the breast-fed infant. The blood of most eczematous infants is low in linoleic acid and most cases respond dramatically when the deficiency is relieved.

Soyola should be tried in such cases. It is a stable, palatable emulsion of soybean oil, a rich source of n-linoleic acid.

PINT BOTTLES
Dose: 3-6 teaspoonfuls per day



Wyeth®

SOYOLA®

SOYBEAN OIL 65% • RICE BRAN CONCENTRATE 5%

WYETH INCORPORATED • PHILADELPHIA 3, PA.

® Reg. U. S. Pat. Off.



IN ACUTE DIARRHEA IN CHILDREN

GLUCO-SULFADIAZINE

"Nowhere are the results of sulfonamide therapy more striking than in the treatment of diseases of children."[1] In acute diarrhea in children, absorbed sulfonamides have proved to be effective in *Shigella* infections.[2] Since acidosis and dehydration are also almost always present in these children and must be vigorously combated, the use of a sulfonamide with a sodium lactate–glucose base is most desirable.

GLUCO-SULFADIAZINE—a suspension of Sulfadiazine in a vehicle of glucose and sodium lactate—is particularly indicated in acute diarrhea in children because:

GLUCO-SULFADIAZINE contains Sodium Lactate, which is the most desirable alkali to use in preventing renal complications, crystalluria, and acidosis.

GLUCO-SULFADIAZINE assures positive dosage, eliminating overdosing or underdosing.

GLUCO-SULFADIAZINE provides higher blood concentrations than when the drug is administered in tablet form, with more rapid absorption.

GLUCO-SULFADIAZINE is exceptionally palatable, so easy to swallow.

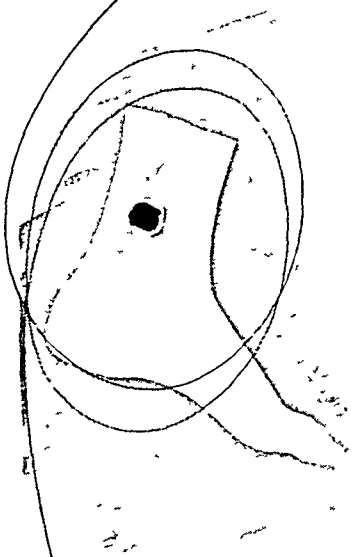
GLUCO-SULFATHIAZOLE • **GLUCO-SULFAMERAZINE**
GLUCO-SULFADIAZINE • **GLUCO-SULFANILAMIDE**

[1]Smith, F. C.: Sulfonamide Therapy in Medical Practice. Philadelphia, F. A. Davis Co., 1944, p. 119.
[2]Watt, J., and Gutelius, M.: New Orleans M. & Surg. J. 99: 266, 1946.

DONLEY-EVANS & COMPANY
SAINT LOUIS 20, MISSOURI

The Impetus Required

IN SLOW-HEALING WOUNDS



Indolent ulcers,
Burns, Infected
Surface wounds,
Non-healing
Lesions

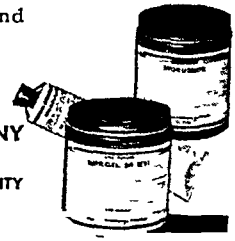
50th ANNIVERSARY

The value of local therapy in chronic skin ulceration lies in speeding up the healing process and thereby shortening the period of disability, and in procuring an end-result which is as nearly normal and free from disfiguration as possible.

To these ends Morruguent and Morumide Ointments lend themselves admirably . . . The active ingredient of Morruguent is cod liver oil concentrate (with a 25% greater content of the unsaponifiable fraction than that contained in cod liver oil U.S.P.). In Morumide, sulfanilamide (10%) has been incorporated, in addition, for its bactericidal action.

Cod liver oil lowers the vitality of pyogenic organisms; sulfanilamide is an active bactericide . . . These preparations prevent or retard infection on an ulcerated surface, reduce systemic absorption of toxic metabolites, hasten granulation and epithelization, and make for a pliable, elastic epithelial surface . . . Healing takes place with a minimum of surface disfiguration.

Morruguent and Morumide Ointments are indicated for topical treatment in chronic indolent ulcers, burns (of any degree), suppurating wounds, non-healing amputation stumps, and similar lesions of the skin.

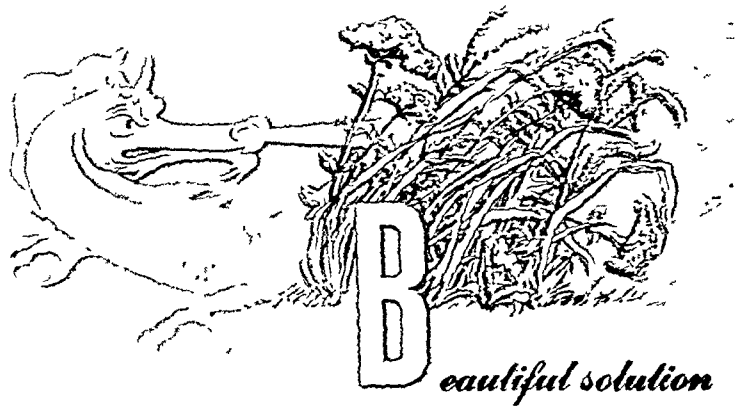


SE Co

THE S. E. MASSENGILL COMPANY
Bristol, Tenn.-Va.
NEW YORK • SAN FRANCISCO • KANSAS CITY

Morruguent • Morumide

Morruguent with
10% Sulfanilamide



Beautiful solution

to a beastly problem . . .

Comes summer . . . comes hay fever . . . comes Neo-Synephrine for relief.

Decongestion of nasal and ocular edema occurs promptly, lasts for hours . . . hypersecretion and excessive lacrimation are quickly checked . . . days are more comfortable, nights more restful.

Neo-Synephrine

BRAND OF PHENYLEPHRINE HYDROCHLORIDE

For hay fever relief

INDICATED for relief of the nasal and ocular symptoms of hay fever, sinusitis and summer colds.

FOR INTRANASAL USE ¼% in isotonic saline and in isotonic solution of three chlorides (Pinger's) with aromatics 1% in saline, 1 fl oz bottles, ½% in water-soluble jelly, ¾ oz. applicator tubes.

FOR OPHTHALMIC USE ¼% in low surface tension, aqueous solution,* isotonic with tears, 15 cc. bottles.

FREDERICK STEARNS & COMPANY • DIVISION

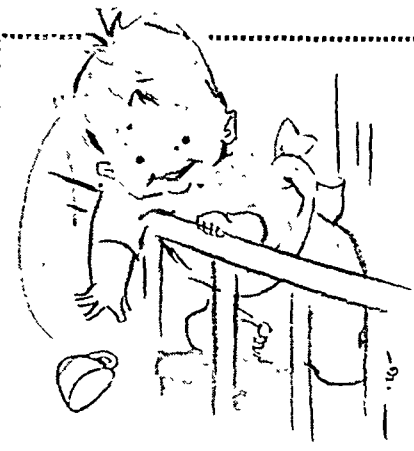
DETROIT 31, MICHIGAN • New York • Kansas City • San Francisco • Atlanta
Windsor Ontario • Sydney Australia • Auckland, New Zealand

*Contains Benzoic [illegible] 1 part of salt with [illegible]

Trade-Mark Neo-Synephrine Reg. U. S. Pat. Off.

A Favorite Dessert With Babies—
Smooth, Delicious
Heinz Strained Applesauce

Not Too Tart—Not Too Sweet—
Just Right for the Infants
in Your Care



WHEN you recommend Heinz Strained Applesauce, you can be sure of its pleasing flavor, fine texture and tempting color! Choice, firm, fully ripe apples are scientifically cooked, strained and packed. The uniform quality and nutritive value of Heinz Strained Applesauce are constantly checked by Heinz Quality Control Department. Prescribe this delicious fruit dish for the babies in your care!

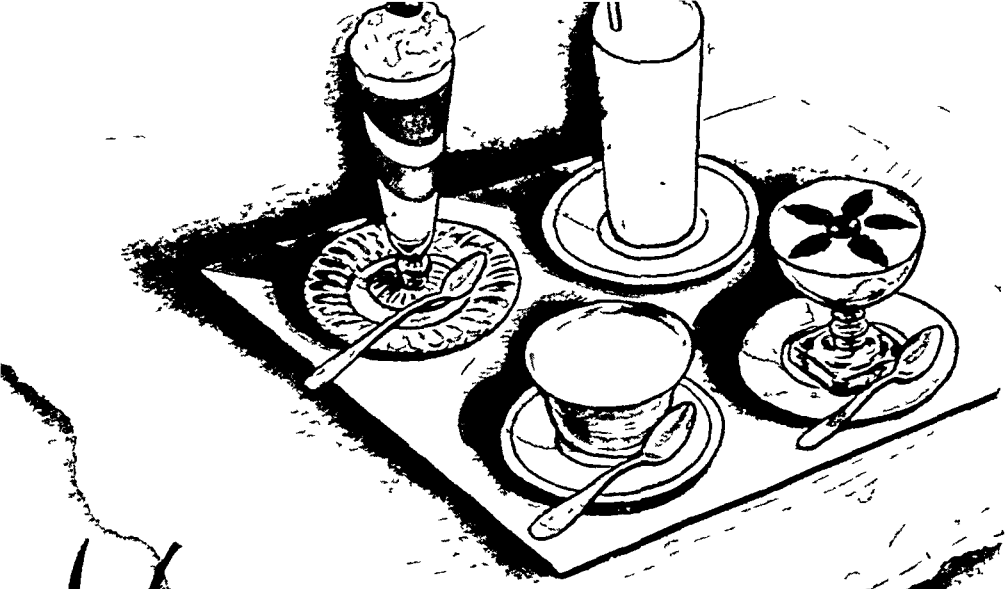
ALL Heinz Strained Fruits —Peaches, Prunes, Apple Sauce, Pears and Pineapple, Apricots and Apple Sauce—have fine flavor, rich color and smooth texture that appeal to your youngest patients!

HEINZ
STRAINED
APPLE
SAUCE
57 VARIETIES
MADE BY
H. J. HEINZ COMPANY

A 78-Year Reputation Backs the Complete Line of

Heinz Baby Foods

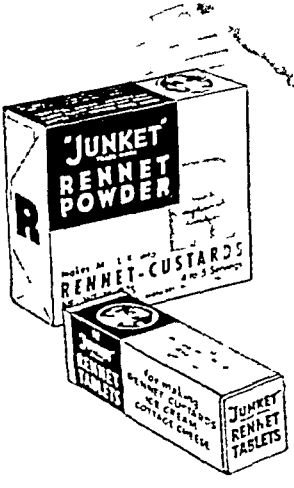
CEREALS • FRUITS • VEGETABLES
MEAT FOOD PRODUCTS • DESSERTS



Variations

ON THE THEME OF MILK

When the basic dietary theme of milk no longer strikes a responsive chord in children or adults—because of aversion or intolerance—the resourceful "composer" may happily resort to a number of variations . . . by changing the consistency and flavor of milk with either "Junket" Rennet Powder or Tablets, to insure an adequate intake of this essential nutrient. • With quickened appeal to retina and taste-buds, deliciously tempting rennet-custards maintain all the nutritional values of milk—yet surpass it in ease of digestibility because of the smaller, softer curds formed in the stomach by the enzymatic action of rennin. • Let us send full details and trial packages. Also, samples of authoritative, time-saving infants' and children's diets—for physicians "personalized" with our compliments. • "Junket" Rennet Powder available in six popular flavors, already sweetened; "Junket" Rennet Tablets—not sweetened or flavored.

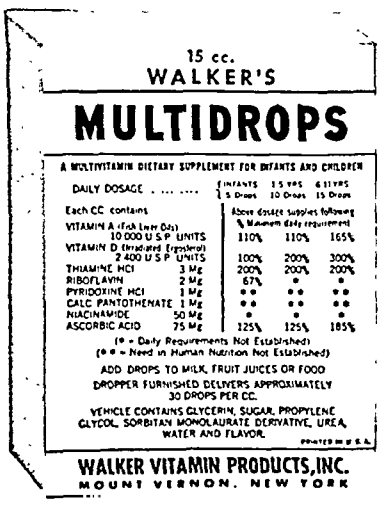


JUNKET is the trade mark of Chr Hansen's Laboratory, Inc. for its rennet and other food products, and is registered in the United States and Canada

"JUNKET" BRAND FOODS
Division of Chr. Hansen's Laboratory, Inc., Little Falls, N. Y.

WALKER

NUTRITIONAL REINFORCEMENT AT THE EXTREMES OF LIFE



The very young and the aged present special problems of nutritional care. For such patients, Walker's MULTIDROPS is an especially convenient and potent aid in dietary management. It offers the advantages of (1) high potency, (2) convenience, (3) palatability, and (4) adaptability to a variety of vehicles (milk, juices, and other foods).

Where nutritional reinforcement with vitamins is indicated, specify:
Walker's **MULTIDROPS**

Walker VITAMIN PRODUCTS, INC. MOUNT VERNON, N. Y.





HUNGRY, HEALTHY, HAPPY Infa-Concemin Kids









Too young to be impressed by the fact that it's good for them, infants and children take Infa-Concemin because it tastes good. They like it! Infa-Concemin is the *one* B complex-iron concentrate designed specifically for small patients. It combines: (1) pleasant taste, (2) the *whole* B complex. (3) an adequate hematinic, and (4) concentrated drop dosage.

....INFA-CONCEMIN..... A MERRELL PEDIATRIC SPECIALTY....

Vitamin B Complex with Ferrous Sulfate

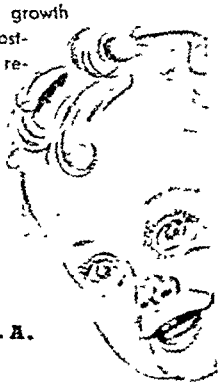
Each 1 cc. contains:

Thiamine hydrochloride	0.8 mg.
Riboflavin	0.8 mg.
Niacinamide	5.0 mg.
Pyridoxine hydrochloride	0.5 mg.
Liver, B complex fraction	67.5 mg.
Rice bran extract	67.5 mg.
Ferrous sulfate	37.5 mg.

Indications

Deficiency states associated with anorexia—malnutrition—restricted growth—irritability; as a tonic in post-sulfonamide debilitation and recuperative phases of severe respiratory infections.

Average dose 1 to 3 cc daily (20 to 60 drops from dropper enclosed in package) in milk, fruit juice or directly into the mouth. Available in 30-cc dropper bottles and 8 oz bottles



Trademark "Infa-Concemin" Reg U S Pat Off

MERRELL 1828

THE WM. S. MERRELL COMPANY · CINCINNATI, U. S. A.

"...the weight curve

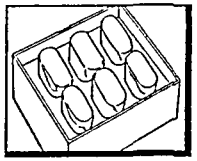


White LABORATORIES, INC., Pharmaceutical Manufacturers, Newark 7, N. J.

TWO USEFUL PRODUCTS FOR BUSY PHYSICIANS

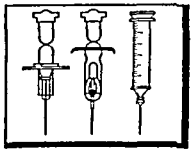
1 PENICILLIN VAGINAL SUPPOSITORIES *Schenley*

containing 100,000 units of penicillin each... provide a new, convenient, painless method of applying the drug directly at the site of infection. In resistant cases 2 suppositories per application may be used. Supplied in boxes of 6 and 12.



2 PENICILLIN IN OIL AND WAX *Schenley* (*Romansky Formula*)

in B-D* Disposable and Metal Cartridge Syringes. Cartridges contain 300,000 units of penicillin. Also available in 10-cc. vials, each cc. containing 300,000 units, suitable for use with the standard glass syringe. No refrigeration is required...easier to use in and out of the office.

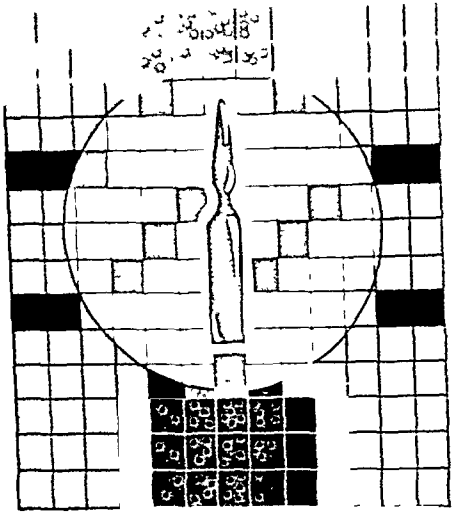


Schenley LABORATORIES, INC.
EXECUTIVE OFFICES 350 FIFTH AVENUE • NEW YORK 1, N. Y.

© Schenley Laboratories, Inc.

*Trade Mark Reg., Becton-Dickinson, Inc.

PREMENOPAUSE



The premenopausal years—the late thirties and early forties—are often marred by many symptoms resembling those of the true climacteric. The origin of these symptoms may be obscure, however, because a history of changed menses or "hot flashes" is lacking. In such instances, a therapeutic test with a potent injectable estrogen aids in diagnosis by differentiating between hormonal imbalance and other causes. It is essential, of course, that the estrogen chosen be one which always produces unequivocal improvement whenever estrogen deficit exists.

PROGYNON-B

(alpha-estradiol benzoate)

PROGYNON-B has been proven to be the most desirable injectable estrogen for the premenopausal therapeutic test. Its high and uniform potency assures rapid and complete amelioration of symptoms due to follicular hormone deficiency. Being non-toxic even in the highest therapeutic dosage range, PROGYNON-B will not produce side effects to vitiate clear differential diagnosis or distress the patient.

DOSAGE for therapeutic test: PROGYNON-B, 1.0 mg. (6000 R.U.), injected intramuscularly three times weekly for two weeks. The beneficial effects resulting from a positive test may be continued subsequently by injecting 1.0 mg. (6000 R.U.) or 0.33 mg. (2000 R.U.) once weekly, depending on the individual degree of estrogen deficiency.

PACKAGING: PROGYNON-B is available in ampules of 1 cc. containing 0.03 mg. (500 R.U.), 0.16 mg. (1000 R.U.), 0.33 mg. (2000 R.U.), 1.0 mg. (6000 R.U.) and 1.66 mg. (10,000 R.U.) in boxes of 3, 6, 30 and 100. Vials of 10 cc. (0.166 mg. per cc.) in boxes of 1 and 6.

Trade Mark PROGYNON-B—Reg. U. S. Pat. Off.

Schering CORPORATION • BLOOMFIELD, N. J.

IN CANADA: SCHERING CORPORATION LIMITED, MONTREAL

TO THE MOTHERS WHO SAY, "MY CHILD WON'T EAT VEGETABLES!"



RECOMMEND DELICIOUS KNOX DISHES MADE WITH VEGETABLES!

To paraphrase an old adage, "You can lead a child to a vegetable, but you can't make him eat!" That's why so *many* doctors recommend vegetable dishes made with Knox Gelatine. You see, Knox dresses up vitamin-rich vegetables in such a delicious fashion children will eat them right down to the last bite!

Next time a mother poses this problem, give her the new Knox Gelatine booklet "Knox Recipes Children Love." We'd be delighted to send you as many copies as you can use.
Write to Knox Gelatine, Dept. 459, Johnstown, N. Y.

KNOX GELATINE ALL PROTEIN, NO SUGAR



Recognize this problem patient?



Maybe his mother's half the problem, if she forgot that you said, "Cereal is baby's *first* solid food after milk. Go slowly, or he may resist cereal for a long time."

But, maybe the texture and taste of his first cereal bothered this young man . . . and still do. He'd probably go for Gerber's! For Gerber's Cereals are so finely strained . . . so good-tasting! And a recent survey shows that . . .

90% of the babies started on Gerber's Cereals **stay with them!** Gerber's Cereal Food, Strained Oatmeal and Barley Cereal give baby appetite-tempting variety—plus *added iron, calcium, and B-complex vitamins.* Ready-to-serve Gerber's are low-priced—from Cereals through Strained and Junior Foods



For FREE SAMPLES of Gerber's 3 Cereals—plus professional reference cards, drop a line to Gerber's, Dept. 278-7, Fremont, Mich.

Babies are our business... our only business!

Gerber's
BABY FOODS
FREMONT, MICH OAKLAND, CAL

3 Cereals • 18 Strained Foods • 13 Junior Foods

TIME AGAIN FOR THE 4 R's



Schooltime soon, for your young patients. The time when they need every bit of energy they can muster.

Hot Ralston Whole Wheat Cereal, at breakfast, helps to give them the right start. This is the whole wheat cereal with extra wheat germ—2½ times as much as natural whole wheat itself! As you know, wheat germ is the richest cereal source of thiamine, (vitamin B_1) — the vitamin needed to convert carbohydrates into energy. You know, too, that every child needs the whole-grain nourishment hot Ralston supplies.



Good reasons why you should recommend hot Ralston as the fourth "R," when school days roll around again!

⇦ TWO KINDS OF HOT RALSTON

RALSTON PURINA COMPANY
Checkerboard Square, St. Louis 2, Mo.



BABY'S FIRST FRIEND

A lovable, huggable pup—perfect pal and body-guard! And like all baby's things, this puppy was selected with care—for nothing's left to chance where baby's concerned

That's why White House Milk is mother's choice for infant feeding It's creamy-rich, with generous amounts of pure vitamin D_3, and homogenized for easy digestibility. Yes, it's ideal for babies, perfect for the whole family. There's none better!

WHITE HOUSE MILK

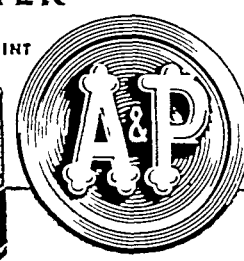
There's None Better

400 U.S.P. UNITS OF PURE VITAMIN D_3 PER PINT

SOLD AND GUARANTEED* BY A&P

Mother's first thought for infant feeding!





*Satisfaction Guaranteed or money back

Not Connected With Any Company Using A Similar Name Or Brand

Physicians rely on research



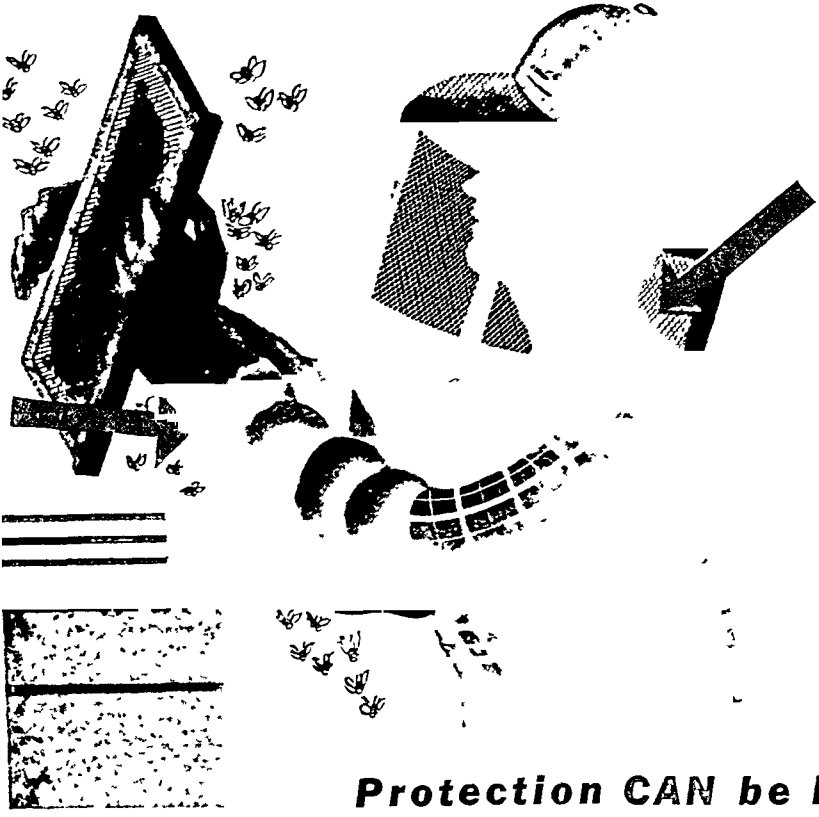
Actual Photograph of Marcelle Laboratory

MEDICAL TRAINING and experience through the years have convinced physicians of the value of research. That's why Marcelle hypo-allergenic Cosmetics enjoy such widespread confidence with physicians. These quality cosmetics are built on research . . . . known allergens have been eliminated or reduced to tenable minimums. You can prescribe them with assurance wherever cosmetics are a causative or contributing factor in allergies. We extend a cordial invitation to inspect our laboratory . . . watch the skilled precision in the blending and testing of these quality cosmetics.

Acceptable for advertising in publications of the American Medical Association for 15 years.

Marcelle COSMETICS

MARCELLE COSMETICS, INC.
1741 N. WESTERN AVE., CHICAGO 47, ILL.



Protection CAN be Planned

It is suggested that protection of the teeth may be planned with "Enziflur" — a combination of calcium fluoride and vitamins C and D.

"Enziflur" Lozenges should be allowed to dissolve slowly in the mouth in order to bring the fluorine-bearing saliva in prolonged contact with the surfaces of the teeth.

Descriptive literature outlining indications, dosages and contraindications available to physicians and dentists upon request.

"Enziflur" Lozenges (No. 805) are available in bottles of 30, 100 and 1000.

Ayerst

"ENZIFLUR"® *Lozenges*

AS AN AID IN THE PREVENTION OF DENTAL CARIES

AYERST, McKENNA & HARRISON Limited

22 EAST 40TH STREET, NEW YORK 16, N. Y.

Try this Yourself,

Doctor...



Rare is the person who does not enjoy a piece or two of candy at the end of a meal. The satisfying goodness of candy creates an aura of well-being which, postprandially, is conducive to good digestion of the meal just eaten.

That candy has a worth-while place in the dietary is evident from the foods with which most candies are made—eggs, butter, milk, fruits and nuts. To the extent these foods are present, candies contribute valuable protein, B complex vitamins, and minerals.

In the sickroom, candies serve a double purpose. They frequently are eaten when many foods are refused because of anorexia, and serve to provide high caloric value in concentrated form. Of equal significance, convalescent patients usually experience a distinctly beneficial psychic lift from a tasty piece or two of candy.

These unique advantages of candies more than justify their inclusion in the daily dietary, not only of adults, but of children as well.

COUNCIL ON CANDY OF THE NATIONAL CONFECTIONERS' ASSOCIATION

1 NORTH LA SALLE STREET • CHICAGO 2, ILLINOIS

ve immediately affected . . .

An immediate accelerated weight gain may occur when B vitamins are supplemented to the average infant diet—anorexia, fretfulness, spasticity and digestive disturbances may also often be reduced. [1,2,3]

As a supplement to the average infant diet, five drops daily of White's Multi-Beta Liquid provide the important vitamin B factors in amounts proportionate to their average insufficiency in such diets.

Pleasant-tasting, easy to take, freely miscible in milk mixtures, orange juice or other liquids, soft feedings—or directly from dropper. Notably stable.

1) Gaynor, M. F. and Dennett, R. H.: J. Ped., *4*:507-13 (April) 1934.

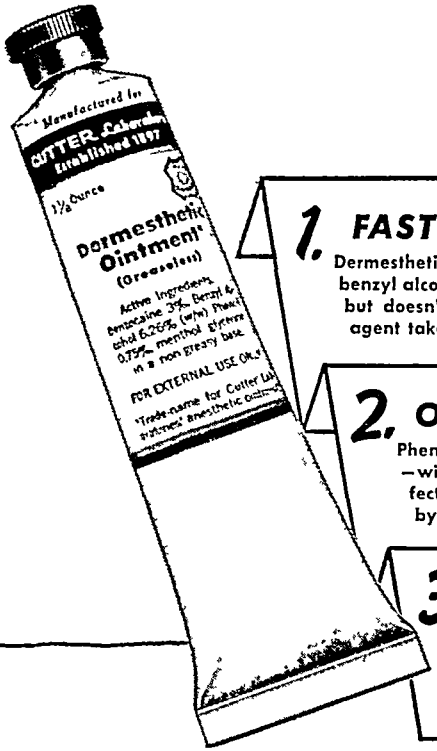
2) Hoobler, B. R.: J. A. M. A., *96*:675-77 (Feb. 28) 1931.

3) Poole, M. W., Hamil, B. M., Cooley, T. B., Macy, I. G.: Am. J. Dis. Child., *54*:726-749 (Oct.) 1937.

Multi-beta *Liquid*

. . . to correct inadequacies in infant diets

k 7, N.



1. FAST

Dermesthetic Ointment contains benzyl alcohol, which works fast but doesn't last. So the second agent takes over . . .

2. OVERLAPPING

Phenol offers intermediate relief —with moderately prolonged effect. And it in turn is overlapped by the third agent . . .

3. PROLONGED

Benzocaine, which has already begun to soothe the affected areas, continues to relieve itching over a prolonged period.

NEW TRIPLE-ACTION ITCH RELIEF!

CUTTER DERMESTHETIC OINTMENT* gives 3-phase control of pruritus! Acts fast—medium—slow! It relieves itching at once! It prolongs the soothing effect! It minimizes psychic trauma.

And here's the reason why...Cutter Dermesthetic Ointment provides three anesthetic properties with overlapping action.

Fast-acting, long-lasting Dermesthetic Ointment stops itching caused by poison ivy, poison oak, insect bites, industrial rashes and other pruritic conditions. Greaseless, it does not dissolve and spread oil-soluble irritants. It can be removed easily, will not stain skin or clothes.

While not intended as a bactericidal agent, Dermesthetic Ointment with its benzyl alcohol and phenol content is bacteriostatic. This bacteriostatic action, in combination with the quick, lasting relief from pruritus, helps to avoid possible infection from scratching.

Try it, won't you? Clinical samples will be sent on request.

*Cutter's trade name for Anesthetic Ointment

CUTTER

Fine Biological and Pharmaceutical Specialties

CUTTER LABORATORIES • BERKELEY 1, CALIF.

EFFECTIVES . . .
but not cure-alls



Modern therapeutics support the premise that no single medication will successfully combat all ear conditions. For that reason . . . DOHO, specialists in the development of effective ear medications . . . offer

Auralgan

IN ACUTE OTITIS MEDIA

When pain, fever, edema, leucocytosis, sense of fullness and impaired hearing are present—AURALGAN by its potent decongestant, dehydrating and analgesic action provides effective relief of pain and inflammation.

O-TOS-MO-SAN

IN CHRONIC SUPPURATIVE OTITIS MEDIA

O-TOS-MO-SAN provides a new Sulfa combination of Sulfathiazole and Urea in Auralgan Glycerol (DOHO) base, completely water-free and having the highest specific gravity obtainable—scientifically developed.

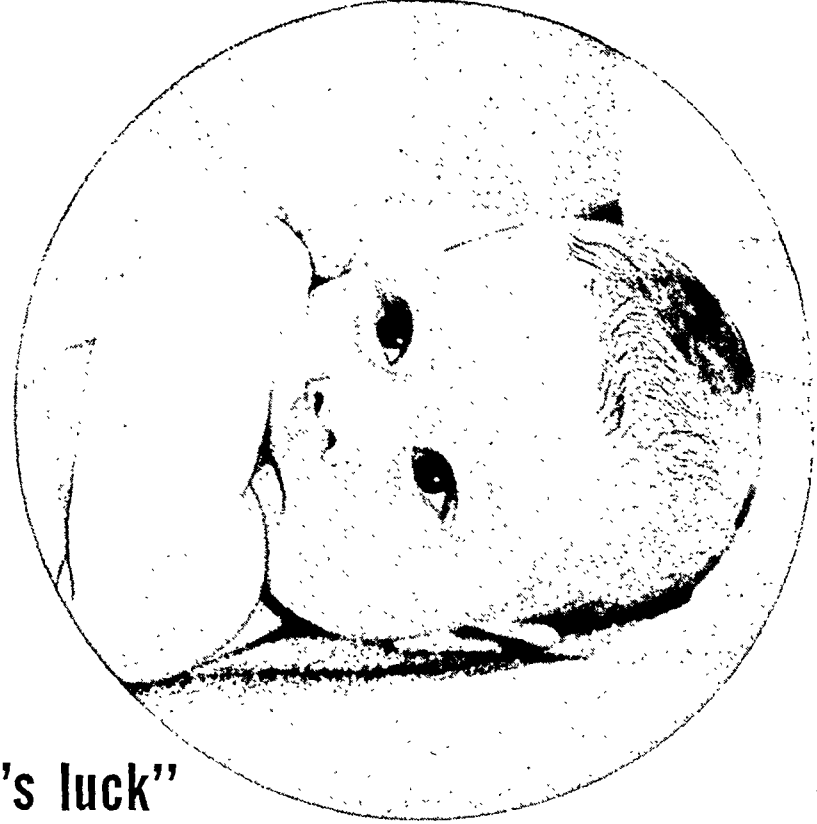
O-TOS-MO-SAN exerts a powerful solvent action on protein matter . . . liquefies and dissolves exuberant granulation tissue . . . cleanses and deodorizes the site of infection . . . and tends to exhilarate normal tissue healing in the effective control of chronic suppurative Otitis Media. Excellent results have also been obtained in furunculosis of the external ear canal.

NOTE:
Where there is an intact ear drum, neither Sulfonamides nor Urea are effective . . . and under these conditions AURALGAN is indicated.

WARNING!
The indiscriminate use of the Sulfonamides should be avoided—so that infectious organisms do not become "sulfa-fast" or patients "sensitive" to Sulfa.

Write for Literature and Samples

THE DOHO CHEMICAL CORPORATION
New York 13, N. Y. • Montreal • London



"Beginner's luck" isn't always good

The good luck so often attributed to beginners can't be counted on in infancy. Here the "beginners" often meet insurmountable obstacles which have raised the proportion of infant deaths within the first 30 days to 62.1% of the total infant mortality.* During this hazardous first month proper selection of the first formula is therefore of vital importance.

'Dexin' has proved an excellent "first carbohydrate" because of its high dextrin content. It (1) resists fermentation by the usual intestinal organisms; (2) tends to hold gas formation, distention and diarrhea to a minimum, and (3) promotes the formation of soft, flocculent, easily digested curds. 'Dexin' *does* make a difference.

*Vital Statistics—Special Reports: Vol. 25, No. 12, National Office of Vital Statistics, Washington, D. C. (Oct. 15) 1946, p. 206.

'Dexin' BRAND HIGH DEXTRIN CARBOHYDRATE

Composition—Dextrins 75% • Maltose 24% • Mineral Ash 0.25% • Moisture 0.75% • Available carbohydrate 99% • 115 calories per ounce • 6 level packed tablespoonfuls equal 1 ounce • Containers of twelve ounces and three pounds • Accepted by the Council on Foods and Nutrition, American Medical Association.
'Dexin' Reg. Trademark

Literature on request

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 East 41st St., New York 17, N. Y.

To Forestall.....

"the emotional pull away from a good diet"[1]



What mother hasn't encountered this emotional pull! And what mother wouldn't welcome your help in combating it! Here *is* help—in CEREVIM. For this delicious cereal-food appeals to most children . . . they take it without coaxing.

CEREVIM

a first among first foods

And CEREVIM is so high in vitamins and minerals that even when children rebel against a well-rounded diet, this precooked cereal alone supplies generous amounts of protective factors. A single 1-ounce serving of CEREVIM furnishes the recommended daily allowance of iron, thiamine, riboflavin, and niacin for children up to 3 years of age (as well as 8 times the calcium in a fluid ounce of milk).[2]

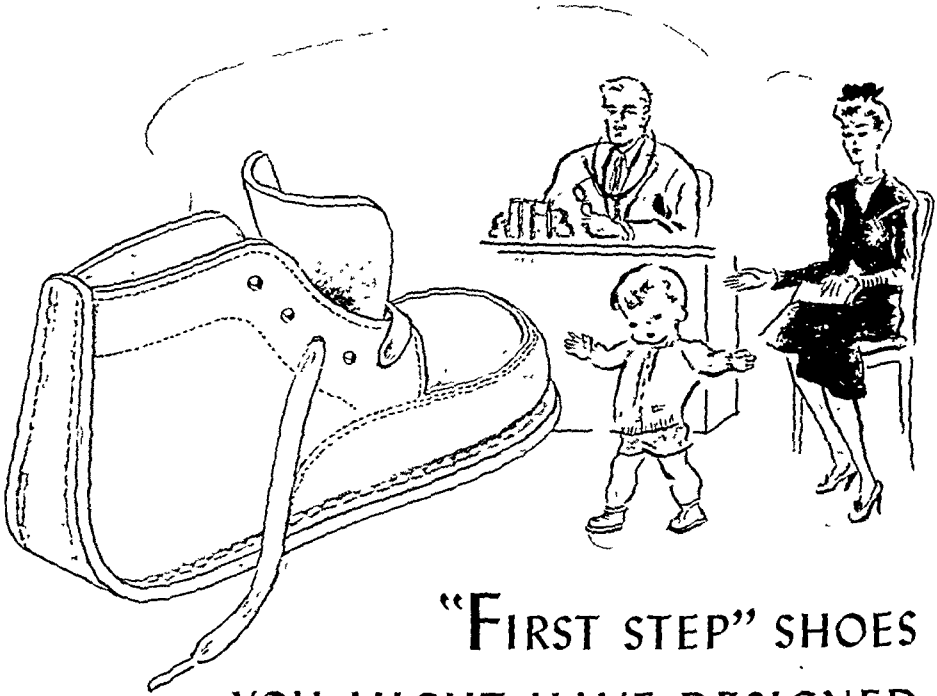
CEREVIM is a truly valuable ally for the physician and the mother when children become "feeding problems."

1. Clair E. Turner (address to the Institute on Social Medicine, Centennial, New York Academy of Medicine).
2. National Research Council, Recommended Dietary Allowances, 1945.

Trade-Mark CEREVIM—Reg. U.S. Pat. Off.

Lederle

LEDERLE LABORATORIES DIVISION
AMERICAN CYANAMID COMPANY • NEW YORK 20, NEW YORK



"FIRST STEP" SHOES YOU MIGHT HAVE DESIGNED



JUMPING-JACKS DO THESE SIX THINGS:

1. Make the child walk straight by holding heel bones in correct position.
2. Prevent ankles from turning in or out.
3. Develop foot and leg muscles; no stiff counters or shanks.
4. Hold their shape until outgrown . . . no heel or striking edge to wear off.
5. Provide proper flexibility; it's like walking barefoot.
6. Encourage the child to step out confidently.

As a pediatrician, you know what first walking shoes should do for the normal baby foot. If you were also an expert shoe designer, you might well accomplish your six objectives (as listed at left) as we have done . . . with an extension sole running all the way from the toe up the heel to the shoe-top, the exclusive, patented feature that makes Jumping-Jacks unique.

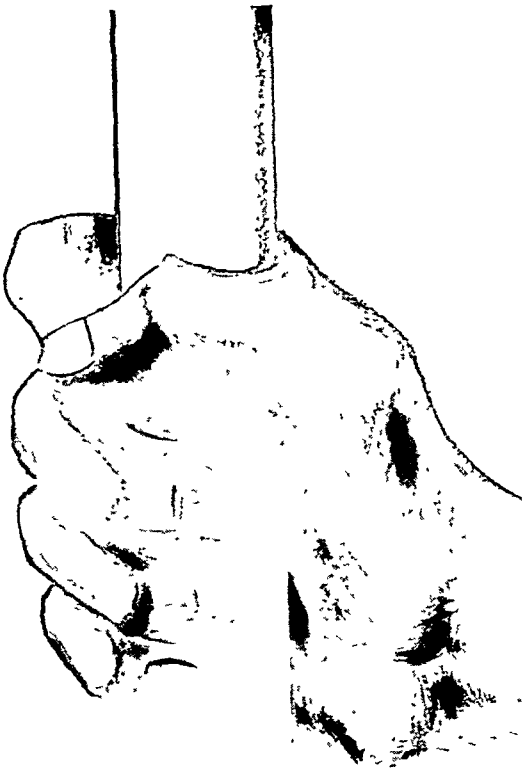
Compare the orthopedic features of Jumping-Jacks with those of other shoes for children six months to three years old. Compare their quality, looks, and value. You'll find you can "prescribe" Jumping-Jacks with the same confidence you place in an accepted pharmaceutical.

JUMPING-JACKS
SOFT SHOES FOR HARD WEAR

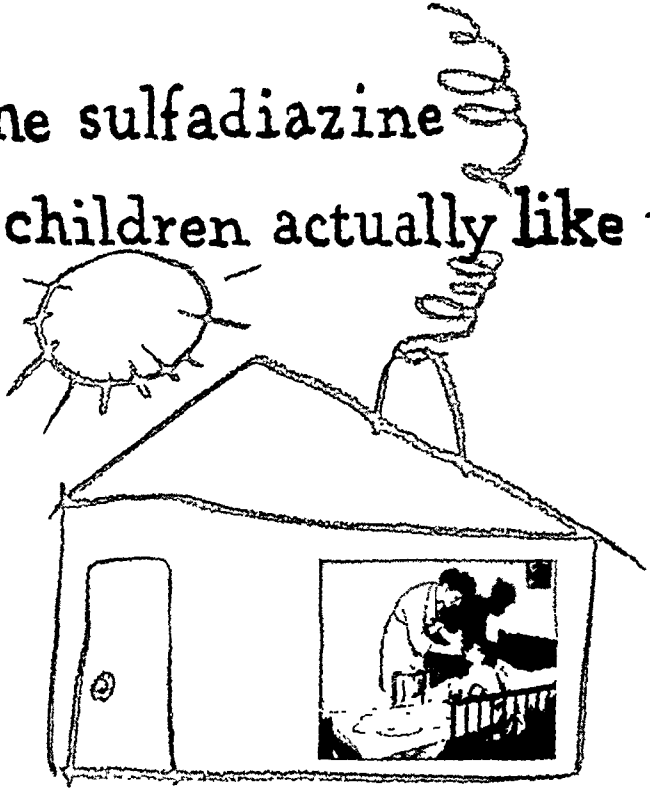
Write for descriptive literature and name of your nearest dealer

S. B. VAISEY SHOE CO., INC.
625 SO. GOODMAN STREET • ROCHESTER 7, N. Y.

break the grip of an asthmatic attack



Here's the sulfadiazine that children actually like to take



Children have no reluctance in taking ***Eskadiazine***



Exceptionally flavorful, this fluid sulfadiazine is the ideal dosage form for your young patients. They take it willingly because it tastes good. And it relieves tired parents and busy nurses of the chore of crushing tablets and coaxing a sick child to swallow an unappealing mixture.

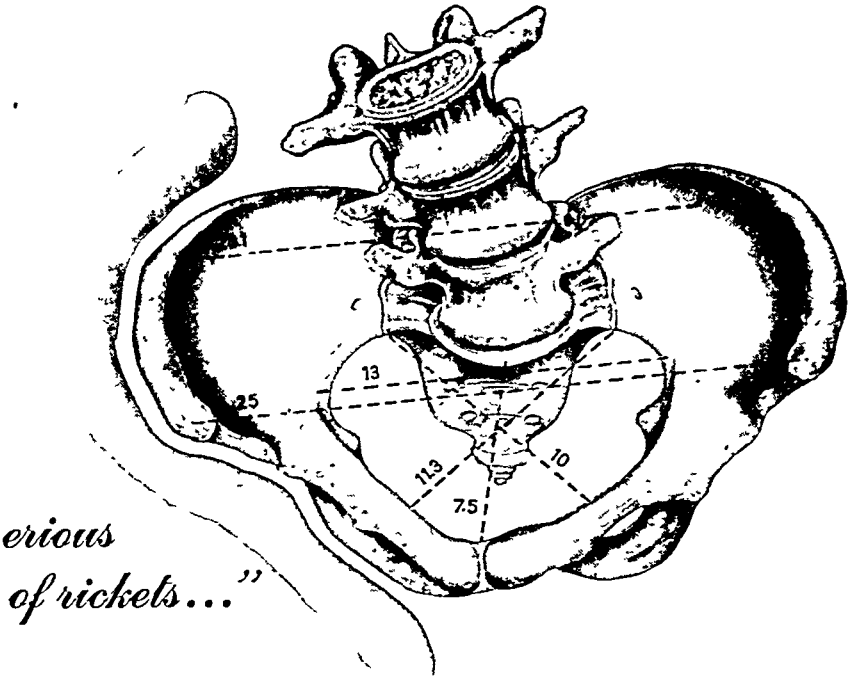
Important, too, is the more rapid absorption of Eskadiazine. Flippin and associates* have established that desired serum levels are attained in two hours, rather than the six hours required for sulfadiazine in tablet form.

Smith, Kline & French Laboratories, Philadelphia

Eskadiazine

*Am J. M. Sc. 210 141. 1945

the outstandingly palatable fluid sulfadiazine for oral use



"The most serious result of rickets..."

In the opinion of many clinicians, "pelvic distortion . . . is the most serious result of rickets."[1] Severe deformities which "obstruct childbirth and may cause death of both mother and infant"[2] as well as "the so-called 'simple flat' pelvis"[3] are often "rachitic in origin."[3] In the prevention of rickets and other vitamin deficiency syndromes, the use of Vi-Penta Drops 'Roche' offers clinically important advantages. The drops are willingly taken even by "difficult" patients since they are miscible and may be added to milk, fruit juice or other foods without significantly affecting the flavor. The comprehensive formula of Vi-Penta Drops supplies in each 10-minim dose no less than 1000 U.S.P. units of vitamin D *plus* ample amounts of vitamins A, B_1, B_2, C and niacinamide. Vi-Penta Drops are available in 15-cc and 30-cc vials. For a free trial supply, write to department V-3, Hoffmann-La Roche Inc., Roche Park, Nutley 10, New Jersey.

1. F. Bicknell and F. Prescott, The Vitamins in Medicine, Grune & Stratton, 1946.
2. M. M. Eliot and E. A. Park, Brennemann's Practice of Pediatrics, W. F. Prior Co, Inc., 36.66, 1946.
3. J. B. De Lee and J. P. Greenhill, Obstetrics, W. B. Sanders, 1943.

VI-PENTA DROPS 'ROCHE'

T.M.—Vi Penta—Reg U S Pat Off.

HOFFMANN-LA ROCHE INC • NUTLEY 10 • NEW JERSEY



for the patient with distressing urinary symptoms

The prompt symptomatic relief provided by Pyridium is extremely gratifying to the patient suffering from distressing symptoms such as painful, urgent, and frequent urination, nocturia, and tenesmus.

Pyridium, administered orally in a dosage of 2 tablets *t.i.d.*, will promptly relieve these symptoms in a large percentage of ambulant patients, thereby permitting them to pursue normal activities without undue discomfort.

Since Pyridium acts directly on the mucosa of the urogenital tract, this important effect is entirely local. It is not associated with or due to systemic sedation or narcotic action.

Therapeutic doses of Pyridium may be administered with little fear of serious toxic effects throughout the course of most cases of cystitis, pyelonephritis, prostatitis, and urethritis.

Literature on request.

REG. U. S. **PYRIDIUM** PAT. OFF.

(Phenylazo-alpha-alpha-diamino-pyridine mono-hydrochloride)

MERCK & CO., Inc. RAHWAY, N. J.

Manufacturing Chemists

In Canada: MERCK & CO., Ltd. Montreal, Que.

PYRIDIUM is the United States Registered Trade-Mark of the product manufactured by the Pyridium Corporation. Merck & Co., Inc., Sole Distributors in U. S. A.



The PATIENT APPRECIATES *this new*... "COSMETIC" TAR THERAPY

IN

ECZEMA

PSORIASIS

RINGWORM

OCCUPATIONAL DERMATITIS

FOLLICULITIS

SEBORRHEIC DERMATITIS

INTERTRIGO

INFANTILE ECZEMA

PITYRIASIS

VARICOSE ULCERS

PRURITUS

TINEA CRURIS

TARBONIS presents *all the therapeutic efficacy* of tar in an odorless. greaseless, non-staining, non-soiling, vanishing-type cream.

All the offensive tar odor is removed.

It cannot be detected on the skin after application.

It cannot stain or soil linen or clothing.

It requires no removal before reapplication.

It is NON-IRRITANT.

The active ingredient in TARBONIS is an especially processed Liquor Carbonis Detergens (5%), incorporated. together with lanolin and menthol, in a special vanishing-type cream.

The high therapeutic efficacy of Tarbonis has been demonstrated by a decade of clinical use. Tarbonis is packaged in 2¼ oz., 8 oz., 1 lb., and 6 lb. jars.

Physicians are invited to send for samples of Tarbonis and Sul-Tarbonis.

THE TARBONIS COMPANY

4300 Euclid Avenue • Cleveland 3, Ohio

TARBONIS

REG. U. S. PAT. OFF.

SUL-TARBONIS

WHEN SECONDARY INFECTION SUPERVENES

Sul-Tarbonis (Tarbonis with 5% Sulfathiazole) is packaged in 2¼ oz. and 1 lb. jars.



PROTEIN SPARER

Carbohydrates as protein sparers have particular significance in infant nutrition, which requires a high order of efficient utilization of protein for an active metabolism.

CARTOSE is well tolerated; its content of dextrins in association with maltose and dextrose minimizes gastrointestinal discomfort due to an excessive concentration of readily fermentable sugars in the gastrointestinal tract.

CARTOSE is liquid, facilitating rapid, exact formula preparation. It is compatible with any formula base —liquid, evaporated, or dried milk.

SUPPLIED: In clear glass bottles containing 1 pt. Two tablespoonfuls (1 fl. oz.) provide 120 calories. Available through recognized pharmacies only.

CARTOSE*

Mixed Carbohydrates

*The word CARTOSE is a registered trademark of H. W. Kinney & Sons, Inc

H. W. KINNEY & SONS, INC. — Kinney — COLUMBUS, INDIANA



SIMULTANEOUS ACTION

of "Council Accepted" combined antigens

Convenience is achieved and time saved through the use of National's "D-T-P" (Diphtheria-Tetanus-Pertussis Combined). These combined antigens are prepared from carefully standardized toxoids and bacterial vaccines which provide a maximum of activity in a minimum-dose volume. Alum precipitation, used in all combinations, produces more effective action in stimulating immunity response.

Diphtheria-Tetanus-Pertussis Combined is recommended for infants and pre-school children. Treatment consists of three subcutaneous injections at intervals of from three to four weeks.

DIPHTHERIA - TETANUS - PERTUSSIS COMBINED. ALUM PRECIPITATED

D-T-P

"D-T-P" is available in multiple-dose vials.

NATIONAL

THE NATIONAL DRUG CO. • Philadelphia 44, Pa.

PHARMACEUTICALS, BIOLOGICALS, BIOCHEMICALS FOR THE MEDICAL PROFESSION

heals spontaneously, but again with the formation of scars and an increase of the superficial stricture. Any stricture of the urethra located in the orifice or at higher parts will eventually lead to retrograde pressure and distention with all its after-consequences of infection and pressure-damage.

The disorder was first seen by J. von Bokay, Sr.[1] in 1878 in twenty-three boys that were all Jewish and all circumcised. He called the lesion "urethritis orificii externi." He believed that the condition was due to poor hygiene but expressed the opinion that it may also be due to certain irritating properties of the urine. F. R. Sturgis[2] gave the first description of the entity in American literature in 1890. H. Goldenberg,[3] in 1910, presented one case describing the lesion in detail, but without consideration of etiology and treatment. T. S. Southworth[4] believes trauma and ammoniacal urine to be the etiologic factors. J. Zahorsky,[5] in a paper on diaper rash, mentions the disorder and believes the skin condition to be the essential etiologic factor. J. V. Cooke [6, 16] describes the condition in an article on ammonia dermatitis, and in his chapter on the same subject in Brennemann's *Practice of Pediatrics*. A very thorough paper on the condition was published by Brennemann[7] in 1921. He believed at first that the lesion was due to the most accessible and vulnerable part of the glans rubbing against clothing, but he could not explain the extension of the ulcer into the urethra by trauma alone. Since he observed similar lesions appearing simultaneously about the diaper region in many of these cases, he agreed with Zahorsky that "ammonia dermatitis" (diaper rash) should be considered the etiologic factor. In 1922, J. von Bokay, Jr.[8] reported a case in a 13-year-old noncircumcised boy, and thought that the lesion in this boy was brought about by masturbation. He also gave a list of 166 cases that were observed during a period of thirty-seven years at his hospital. Of these, thirty-eight were up to 1 year of age, ninety-four from 1 to 3 years, twenty-five from 3 to 7 years, and nine from 7 to 14 years. A. L. Wolbarst,[9] in his article on stenosed urinary meatus and its treatment, saw the disorder occur when infections and inflammatory swelling further diminished an already tight meatus. He recommends meatotomy and stresses that even this operation has to be followed by dilatations for several weeks to prevent the possibility of recontraction. In 1932, M. F. Campbell[10] published a case of congenital atresia of the meatus in a 7-year-old boy with pyuria and hematuria, and presented the x-ray pictures showing marked dilatation of the urethra and a hypertrophic bladder. The same author,[11] in his book on pediatric urology in 1937, and in his chapter on the male reproductive system in Brennemann's *Practice of Pediatrics* states that he never observed a case where diaper rash alone was responsible for the condition but that only boys with a congenitally tight meatus developed the lesion. An article on coarctation of the meatus was published by B. S. Abeshouse and D. E. Bogorad[12] in 1938. These authors presented thirteen cases of patients ranging from 7 months to 7 years of age, twelve of them circumcised and mostly Jewish; one with a long pendulous foreskin leaving the tip of the glans free to irritation. They consider the ammoniacal urine, discussing metabolic disturbances as its reason and gastrointestinal upsets as possible etiologic agents and are not in accord with Campbell's contention that a congenitally small meatus is the chief predisposing factor.

In This New "Self Selected" Diet Regimen..



IN THE modern day infant feeding plan, where the infant is permitted to choose what he likes from a group of foods offered, Libby's Baby Foods prove especially advantageous. Through Libby's exclusive process of homogenization cellulose cell capsules are ruptured and all fibrous material is reduced to microscopic particles. Hence Libby's Baby Foods are satin-smooth in texture, the nutrients are dispersed homogeneously throughout the food mass, and there is no "separating out" of the solids from the liquid. Libby's frequently have been fed as early as the sixth week of life, conditioning the infant to a wide variety of foods.

Beets • Carrots • Green Beans • Peas • Spinach • Squash • Vegetable Soup • Mixed Vegetables • Garden Vegetables • Liver Soup • Vegetables with Bacon • Vegetables with Beef and Barley • Vegetables with Lamb • Apples and Apricots • Apples and Prunes • Apple Sauce • Peaches • Peaches-Pears-Apricots • Pears and Pineapple • Prunes (with Pineapple Juice and Lemon Juice) • Custard Pudding

Libby, McNeill & Libby • Chicago 9, Illinois



membrane of the urethra became inflamed and superficial ulcerations occurred that extended to a depth of up to 3 mm.

The healing of the ulcers was rather rapid, with the formation of scars. These scars, appearing as small rhagades at the lateral urethral labia of the meatus, were readily seen later on when there was no ulceration or inflammation.

In the majority of the tabled cases and in eleven of the cases not listed, the anterior posterior diameter was not much shorter than 3 mm. [Cases 1, 2, 3, 5, 6 (Fig. 5), 7 (Fig. 7), 8 (Fig. 6), 9, 10, 12, 13, (Fig. 3), 14 (Fig. 1), 20 (Fig. 2), 21 and 22]. In Cases 4, 15, 16, and 18, the anterior-posterior diameter of the orifice was so short that the babies had to be referred to the Urological Clinic, where successful dilatation by bougie was done. In Cases 11 (Fig. 4), 17, 19, 23, 24, and 25 (the last three observed in 1946), there was only a pin-point opening. These cases had to undergo meatotomy.

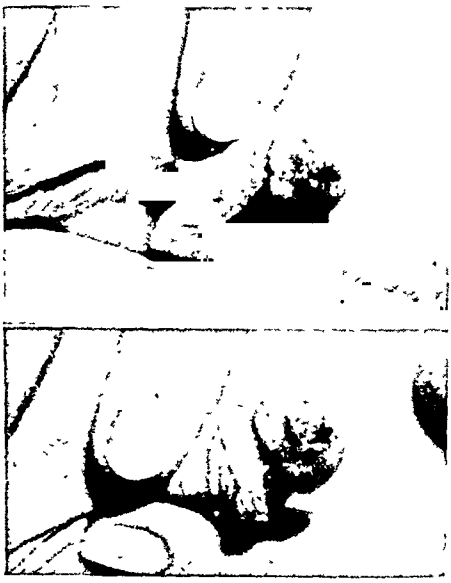


Fig. 1.—*A*, Case 14, L. H., showing the ulcerated meatus and dermatitis localized to the glans, leaving thighs and scrotum entirely free. *B*, Case 14, showing ulceration coarctation.

The lesion occurred usually in circumcised boys. In cases 6, 9, 10 and 24 the glans was left free to irritation by a wide pendulous foreskin. Case 9 was a boy with hypospadias and ulcerated meatus. This combination has frequently been seen by M. F. Campbell.[11]

In the majority of the cases, ammonia dermatitis was seen as an etiologic skin factor (Cases 1, 4, 5, 7, 8, 10, 12, 13, 15, 16, 19, 21, 22, 23, and 24). Twelve of the fifteen cases not listed showed the same condition. Faulty diet as a probable cause of this dermatitis (too much orange juice, too much cream, butter, or milk) was reported by the mothers of Cases 1, 8, 15, 21, 23, and 24. Ammonia smell and high pH factors of the urine were found in a number of these cases of diaper rash.



FORMULAC FOR GENERAL INFANT FEEDING

FORMULAC Infant Food provides a balanced and flexible formula basis for general infant feeding — both in normal and difficult diet cases.

A product of National Dairy research, FORMULAC is a concentrated milk in liquid form, fortified with all vitamins known to be necessary for proper infant nutrition. No supplementary vitamin administration is necessary with FORMULAC. The Vitamin C content is stabilized, assuring greater safety.

The only carbohydrate in FORMULAC is the natural lactose found in cow's milk—no other carbohydrate has been added. This permits you to prescribe both the amount and the type of carbohydrate supplementation required.

FORMULAC is promoted ethically, to the medical profession only. Clinical testing has proved it satisfactory in promoting normal infant growth and development. On sale in grocery and drug stores throughout the country, FORMULAC is priced within range of even modest incomes.

Distributed by **KRAFT FOODS COMPANY**

NATIONAL DAIRY PRODUCTS COMPANY, INC.

NEW YORK, N. Y.

• For further information about FORMULAC, and for professional samples, mail a card to National Dairy Products Company, Inc., 230 Park Avenue, New York 17, N. Y.



TABLE I

CASE	NAME	AGE	CIRCUMCISED	LENGTH OF ANTERO-POSTERIOR DIAMETER			CRUST FORMATION	DIFFICULTY IN VOIDING	BLEEDING	FAULTY DIET	AMMONIA DERMATITIS	DERMATITIS AFFECTING GLANS OR MEATUS ONLY	HERPES SIMPLEX	TREATMENT			REMARKS
				1-3 MM.	ABOUT 1 MM.	PIN POINT								MICROCUETIP DILATATION	SOUND DILATATION	MEATOTOMY	
									1941								
1	G. J.	2 yr.	+	+			+	+	+	+	+			+			8 oz. orange juice per day substituted by 50 mg. ascorbic acid; two relapses.
2	M. L.	13 mo.	+	+			+	+					+	+			Three relapses.
3	S. J.	3 mo.	+	+			+	+	+			+		+			One relapse.
4	R. L.	7 mo.	+		+		+	+	+		+				+	+	Repeated dilatations with bougie, eventually meatotomy.
5	E. R.	5 mo.	+	+			+	+	+		+			+			Two relapses.
6	S. C.	5 yr.	No	+			+	+	+				+	+			Three relapses.
7	J. L.	2½ yr.	+	+			+		+		+			+			Four recurrences.
									1942								
8	W. A.	8 mo.	+	+			+	+	+	+	+			+			10 oz. orange juice, plenty of butter and cream daily.
9	J. W.	2½ yr.	No	+			+	+				+		+			Hypospadia, frequent ulceration.
10	D. B.	3 mo.	No	+			+	+	+		+			+			Pendular foreskin; four relapses.
11	A. C.	8 mo.	+			+	+	+	+				+			+	Several relapses of herpes but no relapses of ulcers after meatotomy.

INFANTS NEED THREE TO FOUR TIMES MORE PROTEIN PROPORTIONATELY THAN ADULTS*

MEAT APPROPRIATELY PREPARED MAY BE FED AT ANY AGE*

100% meat products for babies

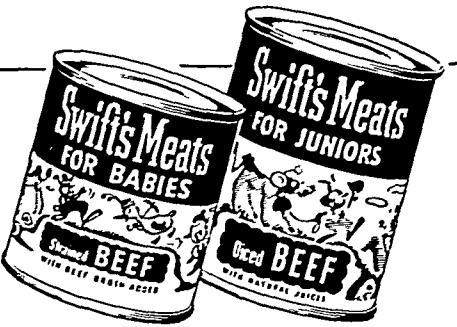
Swift's Meats for Babies and Juniors

All meat—not mixtures—they provide an abundance of complete, high-quality proteins

Swift's Meats for Babies and Juniors are not mixtures—they're 100% meat—one of the finest sources of complete, high-quality proteins, B vitamins and iron. In the past, infants were frequently denied this nutritious food because of the difficulty of preparing it properly in the home. But today, when you prescribe meat in a baby's diet, his mother can feed it *easily—economically*. All she has to do is heat Swift's Strained or Swift's Diced Meats and they're ready to serve! No waste, no fuss or bother.

There's a tempting variety of 6 specially prepared meats: beef, lamb, pork, veal, liver and heart. Each one is a rich source of complete, high-quality proteins. These meats help support baby's rapid growth, which demands 3 to 4 times more proteins, proportionately, than an adult requires! Meat provides blood-building iron abundantly too, as well as thiamine, niacin, riboflavin. Feeding all six Meats for Babies and Juniors not only supplies vital nourishment, but helps baby acquire a taste for variety . . . develop nutritionally sound eating habits.





Swift's Strained Meats and Swift's Diced Meats . . .

meet the exacting requirements of a highly desirable infant food

1. *Nutrition for growth*—Swift's Meats for Babies furnish complete, high-quality proteins, B vitamins and iron.

2. *Compact form*—for infants' limited capacity—*all meat*, not mixtures, they provide a concentrated source of vital nutrients.

3. *Control—for individual needs.* Ready-made mixtures may fail to meet individual needs. Mothers can control and balance amounts of meat *exactly* with Swift's Strained and Swift's Diced Meats.

4. *Variety for nutritionally sound eating habits*—six different all-meat products to help infants acquire the taste for variety, the foundation of good nutrition.

We will be glad to send you further information and samples of Swift's Meats for Babies and Juniors. Write Swift & Company, Dept. R.L., Chicago 9, Ill.

ACCEPTED Council on Foods and Nutrition of the American Medical Association

All nutritional statements made in this advertisement are accepted by the Council on Foods and Nutrition of the American Medical Association.

SWIFT QUALITY FOODS

*Names of authorities on request

SWIFT & COMPANY • CHICAGO 9, ILL.

The majority of the presented cases showed only a moderate shortening of this diameter and ammonia dermatitis. A method which is effective in these cases is to insert, once daily, "microcuetips" (toothpicks prepared in a manner of ear swabs with cotton projecting one-half inch beyond the tip of the toothpick). The mothers were told to put the cotton end into the prescribed ointment and to insert it into the meatus to the depth of about 5 mm. once daily for a



A *B.*

Fig. 1.—*A*, Case 11, A. C., first attack. Multiple fissures around orifice. Small ulcer near dorsal end of opening. *B*, second attack. Multiple small fissures on lateral labia with constriction of orifice. Blister on right labium (arrow). About two and one-half times normal size.

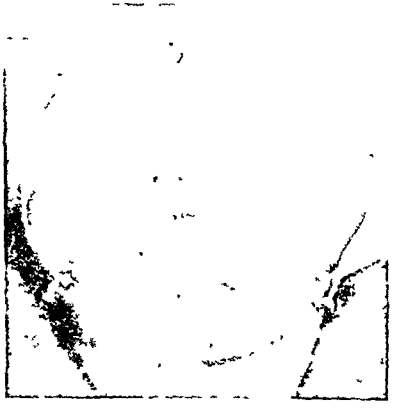
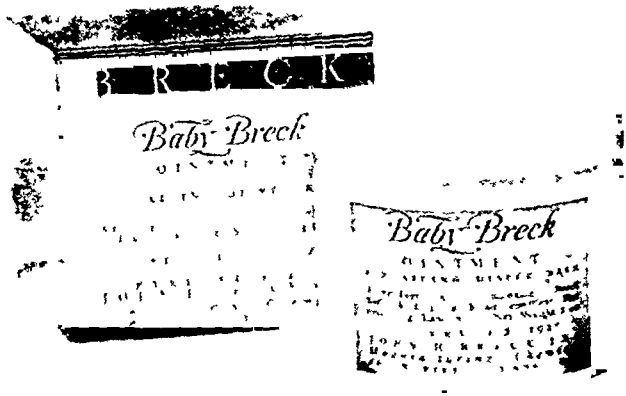


Fig. 5.—Case 6, S. C. Irregularly constricted orifice due to many small labial scars. Ulcer on right labium. Intensive swelling of left labium. About two and one-half times normal size.

period of three months. In these cases, this treatment was sufficient to extend the anterior-posterior diameter to its normal physiological length of about 3 mm. or more. In any case of ammonia dermatitis it is just as important to cure this condition and to prevent its recurrence. The diapers should be treated with a nonvolatile antiseptic. This will prevent the occurrence of ammonia dermatitis. In grees of shortening, bougie dilatation was done in the



Baby Breck

OINTMENT

For Aiding Diaper Rash

Baby Breck Ointment was designed to help eliminate and prevent diaper rash. It gives a waterproof coating to the skin, which is longer lasting than any other ever developed. Baby Breck may be applied once or twice a day, or in the evening to protect the skin through the night period.

JOHN H BRECK INC · MANUFACTURING CHEMISTS · SPRINGFIELD 3 · MASSACHUSETTS
CANADIAN ADDRESS · 350 SLATER STREET · OTTAWA

The Journal of Pediatrics

VOL. 31 AUGUST, 1947 NO. 2

Original Communications

THE ULCERATED URETHRAL MEATUS IN MALE CHILDREN

PAUL FREUD, M.D.
NEW YORK, N. Y.

SUPERFICIAL ulceration of the urethral meatus is a definite entity occurring in male infants and young boys, which, in spite of its frequent incidence, is little known. It occurs chiefly in circumcised children but may be found in the noncircumcised as well if the prepuce leaves the tip of the glans free to irritation.

This peculiar lesion consists of a superficial ulcer affecting the periphery of the meatus and cracking its labia to a width of up to 3 mm. and its depth to about the same extent. The ulcer always remains superficial and localized and never involves the deeper parts of the urethra. Urethral discharge never occurs and there is no fever. The inguinal lymph nodes are sometimes swollen and tender. Crusts form rapidly on the surface of the ulcer and may partially or completely obstruct the meatus. This leads to difficulty in voiding and therefore is followed by urinary retention.

In many of these cases the children are unable to urinate before the obstructing crust has been removed either by pressure of overflowing urine or *mechanically* by parent, nurse, or physician. Voiding may be deferred from ten to twelve hours.

If the orifice is obstructed by scabs, the bladder will be only incompletely emptied by a divided stream or dribbling. When the crusts come off, the first drop of urine that touches the surface of the ulcer irritates and causes intense pain. The children, therefore, refuse to urinate until an overflowing bladder forces voiding. Following the passage of a few drops of urine, pain diminishes and enables the children to urinate. As soon as a scab comes off, bleeding occurs from the ulcer and bright bloody spots on the diapers or pants are frequently the first sign that alarms the parents.

Secretion on the surface of the ulcer soon starts again after the scabs have come off and new crusts are formed, causing the same difficulties and bleeding when they are removed. This vicious cycle may repeat itself many times. Eventually the ulcer heals spontaneously with resulting small constricting scars. After an interval of some time the disorder recurs and, if not treated,

From the Department of Pediatrics, New York Medical College, Flower and Fifth Avenue Hospitals, and the Metropolitan Hospital of the City of New York.

meatus is, here, clearly a result and not a cause of the ulceration, and in my experience has never seemed to need meatotomy."

In order to approach this problem, the urethral orifices of circumcised babies and young boys visiting the clinics were carefully checked and their anterior-posterior diameters measured. The first question that had to be answered was, What is a congenital small meatus? H. Gray,[19] in his textbook on Anatomy, states that the external urethral orifice is a vertical split bounded on either side by two small labia, its length in adults being 6 mm. The definition of a stenosis concerning this split-shaped opening is simple because it can occur only in one direction and consists of a shortening of the anterior-posterior diameter.

Careful observation of the presented cases shows that congenital shortening of this diameter can well be differentiated from secondary constriction of the orifice, which occurs due to inflammatory scarring. The lateral labia are completely intact in congenital stenosis, and the split-shaped opening is well preserved. In secondary stenosis, there are fissures or rhagades, and in many of them there is an irregularly deformed orifice.

In none of the tabled cases was the lesion seen where the anterior-posterior diameter of the urethral opening was more than 3 mm. In one of the tabled cases (20) and in three of the nonlisted children, brothers had been seen at the clinic with the same lesion. This family occurrence supports the opinion that the congenitally small meatus may be a predisposing factor of the disorder. Two patients out of the fifteen not listed, one of them 5 months, the other 8 months of age, showed a normally sized urethral orifice with an anterior-posterior diameter of more than 3 mm. In these two cases the ulceration was brought about by an enormous inflammatory swelling due to ammonia dermatitis without predisposing stenosis of the meatus. The other patients not listed had diameters measuring up to 3 mm. except for two patients with a shorter diameter required bougie dilatation and two patients with a pin-point opening who had to undergo meatotomy. If, in cases of congenital stenosis, the diameter is further shortened by swelling caused by a dermatitis, the disorder is likely to occur. In fifteen of the twenty-six tabled cases and in ten of the sixteen not listed, the meatus showed only a moderate degree of narrowing (1 to 3 mm. anterior-posterior diameter length). This series probably contains borderline cases of stenosis not definitely proved. However, it seems likely that even moderate stenosis constitutes a predisposing factor. Further investigations on a larger scale will be necessary to decide whether stenosis is an essential cause, or whether inflammation around the urethra, as seen in ammonia dermatitis, may be the only etiologic factor.

SUMMARY

1. Superficial ulceration and coarctation of the urethral orifice has been observed in forty-one cases.

2. Its etiology has been discussed, and in all cases but two, congenital shortening of the anterior-posterior diameter of the external meatus has been found.

W. Hofmann,[13] in 1940, described a case of ulcerated meatus in a circumcised infant. In this case, however, the stenosis was not congenital but due to postoperative adhesions following the circumcision. In his paper on stenosis of the external urethral meatus, M. F. Campbell[14] states, in 1943, that 98 per cent of the stenosed cases are congenital. As a complication of this stenosis, ulceration occurs when and if inflammatory swelling narrows the stenosed orifice still more. After a description of the clinical criteria, he stresses the fact that, in spite of the generally accepted opinion, this disorder should not be considered as benign since urinary back pressure damages the proximal urinary tract and particularly the kidney. In sixty-three out of his 152 patients that ranged in age from 7 weeks to 16 years, urographic findings were abnormal. He recommends liberal meatotomy followed by "periodic progressive dilatation" of the stenosed meatus and treats coexisting infections with urinary antiseptics.

It is astonishing how few articles on this frequent and important disorder have been written and how little the condition is known. Apart from the discussions in Brennemann's *Pediatrics,*[15] the subject is hardly mentioned in pediatric textbooks. J. P. C. Griffith and A. G. Mitchell[17] speak about an inflammation of the external urethral orifice probably due to ammoniacal urine. C. Noeggerat and A. Eckstein,[18] in Pfaundler and Schlossmann's Handbuch Der Kinderheilkunde, give a short description of the disorder.

CASE REPORTS

Twenty-two of the twenty-five cases listed in the table were observed in the pediatric clinics of the Flower and Fifth Avenue Hospitals and the Metropolitan Hospital in New York, at regular intervals for a period of at least one and a half years. The infants were of Jewish, Irish, Italian, Puerto Rican, and Negro extraction. Three of them were breast fed (Cases 3, 10, and 18). Since relapses of the condition may occur after 5 to 8 months of symptom-free intervals, it is only possible to regard a patient as cured after a long period of observation. Therefore, sixteen more patients, ranging in age from 5½ months to 7 years, with ulcerated meatus, seen at these clinics, are not listed in this table because the mothers failed to bring them back for regular check-ups.

All of the tabled and thirteen of the nonlisted cases showed a shortening of the anterior-posterior diameter of the urethral orifice to 3 mm. or less. In severe cases, only a pin-point opening could be seen. Several patients (Cases 15, 16, and 19) were seen first only with a congenital shortening of the anterior-posterior diameter and no other pathognomonic signs, and later on came back to the clinic with the typical picture of an ulcerated meatus. There was first an erythema involving the tip of the glans, then small vesicles appeared at the margin of the external meatus. Their rupture left small ulcerations that eventually became confluent. They were situated at the mucocutaneous border surrounding the meatus for a diameter of 2 to 4 mm. These ulcerations were covered by a gray scab that was so firmly adherent that its removal caused pain and bleeding. Due to these scabs, the adjacent labia of the meatus became firmly attached and obstruction was produced. Only after a certain time of obstruction the mucous

SEX PRECOCITY AND THE ADRENOGENITAL SYNDROME

BEATRICE BERGMAN, M.D.
NEW YORK, N. Y.

THE purpose of this paper is to present the present-day concepts of sex precocity and the adrenogenital syndrome, with case histories. An attempt will be made to clarify some of the confusion that exists for the pediatrician regarding these interesting problems, and to outline the current management.

The subject has excited interest from the earliest days of antiquity and references concerning such abnormal individuals can be found in the early Greek writings and in the Old Testament. An excellent historical account may be found in Young's[1] book, describing these abnormalities and recounting the widespread interest that has existed throughout the ages.

DEFINITIONS

In order to have a common basis of understanding, the terminology used in this discussion will be defined.

1. Sex precocity is a condition of childhood characterized by genital development which approaches adult proportions during the first eight to ten years of life.

2. Precocious puberty is sex precocity with further maturation of the child, as manifested by spermatogenesis and menses.

3. The adrenogenital syndrome is a condition characterized by sex precocity resulting from a disturbance of the adrenal cortex, either due to hyperfunction, hyperplasia, or neoplasm, and often associated with metabolic disturbances, known as Cushing's phase of the syndrome.

4. Pseudohermaphroditism is a condition characterized by lack of clear-cut differentiation of the external genitalia, while the internal genitalia are isosexual. This is due to a hyperplasia of the adrenal cortex in utero, and is an instance of the adrenogenital syndrome.

5. True hermaphroditism, on the other hand, is a developmental defect in embryonic life, and is probably not related to the disturbances of the adrenal cortex. The external genitalia in this condition may be of both sexes and the internal genitalia consists of both ovaries and testes, or ovotestes.

DISCUSSION

Sex precocity is usually divided into two etiological groups:

I. the cerebral or hypothalamic group, and

II. the endocrine or abdominal hormonal group[2]

I. *The Cerebral or Hypothalamic Group.*—

This group is due to intracranial lesions, usually situated on the floor of, or in close proximity to, the third ventricle. These lesions are believed to

From the Department of Pediatrics, New York Post-Graduate Medical School and Hospital, Columbia University.

Six patients presented a peculiar dermatitis, which affected only the surroundings of the meatus and parts of the glans. This dermatitis left the skin of the scrotum, thighs, and abdomen entirely free. It consisted of reddened areas that were slightly raised and showed a roughened surface. In none of these cases could ammonia smell from the urine ever be detected, nor was the urine pH increased. Whether a fungus or allergy was responsible for this peculiar dermatitis or whether it was due to other unknown factors could not be determined. In Cases 2, 6, and 11, a typical herpes simplex of the penis was found to be the skin factor. Cultures from the orifice frequently showed *Staphylococcus albus* or *aureus*, but this should not be considered in any way conclusive, since it is almost impossible to avoid contamination of the cultures in this area. The patients ranged in age from 3 months to 7 years. Ulceration, crust formation, difficulty and pain in voiding, and bleeding were the constant signs and symptoms.



Fig. 2.

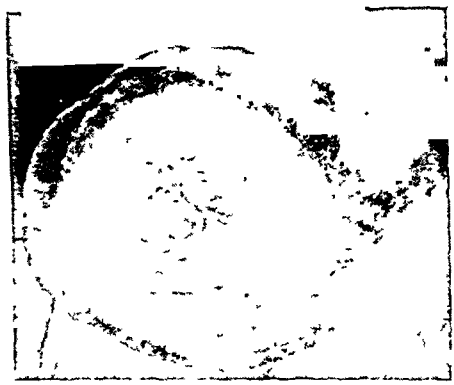


Fig. 3.

Fig. 2.—Case 20, T. G., showing ulcerated meatus and dermatitis localized to glans only.
Fig. 3.—Case 13, V. G., showing congenitally small meatus. No fissures on lateral labia. Beginning reddening and swelling. About two and one-half times normal size.

TREATMENT

The acute condition with difficulty and pain in voiding is best treated according to Brennemann's proposal, by a drop of 2 per cent novocain solution on the surface of the ulcers, which immediately relieves pain and enables the children to urinate. The mothers are told to place the children in a warm bath which stimulates voiding and relieves pain by diluting the escaping urine. The formation of crusts after the removal of a scab can best be prevented by the frequent application of petrolatum or a 5 per cent boric acid lanolin ointment. This is, however, not sufficient in cases where reddening and swelling indicate an acute infection. Here, 5 per cent sulfathiazole ointment in lanolin base or a 5 per cent penicillin ointment have done well.

The cure of the contributing skin factor alone is insufficient as long as the anterior posterior diameter is not lengthened to its normal extent, which in children is 3 mm. or somewhat more. Wherever this has not been attained the condition will recur. In these recurring cases, especially if there are any signs of infection of the genitourinary tract, urography should be done.

17 ketosteroids to those steroids with a ketone group on the 17 carbon atom and a free methylene group. These are further divided into alpha and beta fractions. The alpha neutral ketosteroids are believed to arise from the adrenals and the gonads, while the beta ketosteroids are excretory products of the adrenal cortex. The beta fraction excreted in the urine is about 10 to 15 per cent of the total urinary output, and the alpha about 85 to 90 per cent of the total neutral ketosteroids. Talbot and associates[6] estimate the total daily excretion of neutral 17 ketosteroids in children under 7 years of age as

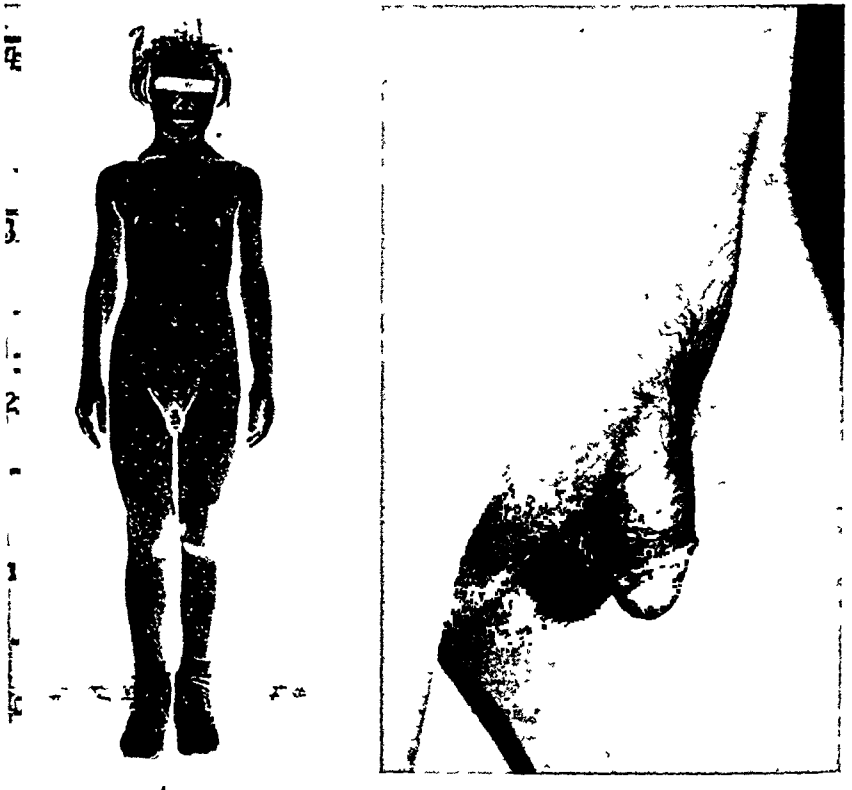


Fig. 1.—A. M. L., aged 3 years. Precocious puberty due to a cyst of the floor of the third ventricle.

0.13 mg. per twenty-four hours, between 7 to 12 years as 4 mg. per twenty-four hours, and between 12 to 15 years as 8.2 mg. per twenty-four hours. In adenomas of the adrenal cortex there is an increase in the total excretion of the neutral 17 ketosteroids and an increase in the per cent of the beta fraction. In adrenal cortical carcinoma the greatest increases occur, and findings up to 857 mg.[7] per twenty-four hours have been reported. Zimmermann[8] developed a color reaction for androgens, and this chemical test is used today, replacing the more difficult biological assay method. Steroids with a ketone group on the 17 carbon atom develop an intense absorption band with a maximum in the green.

12	G. A.	6 mo.	+	+		+	+	+		+			+		Ulceration occurred twice.
13	V. G.	20 mo.	+	+		+	+	+		+			+		No relapse.
14	L. H.	20 mo.	+	+		+	+	+			+		+		No relapse.
								1943							
15	R. W.	18 mo.	+		+	+	+	+	+	+			+		Plenty of cream and butter daily; one relapse.
													+		No relapse.
16	J. A.	18 mo.	+		+	+	+	+		+		+	+	+	Meatotomy after several unsuccessful sound dilatations.
17	L. S.	2 yr.	+			+	+	+					+		Cured after several sound dilatations.
18	R. J.	5 mo.	+		+		+					+	+	+	Several dilatations unsuccessful, cured after meatotomy despite recurring diaper rash.
19	M. S.	2 yr.	+			+	+	+	+	+					
20	T. G.	11 mo.	+	+			+		+			+	+		One brother was observed with the same condition.
								1944							
21	J. S.	15 mo.	+	+			+	+	+	+	+		+		2 quarts of milk daily, diet advice; two relapses.
22	J. K.	2½ yr.	+	+			+	-	+		+		+		No relapse.
								1946							
23	A. A.	5 mo.	+			+	+	+	+	+	+			+	8 oz. orange juice per day, cured after meatotomy.
24	F. P.	5 yr.	No			+	+	+		+	+			+	Plenty of cream daily. Meatotomy. Diaper rash recurring, no more ulceration.
25	R. McM.	22 mo.	+			+	+	+	+			+		+	First attack.

In the male, during childhood, there is precocious virilism. Sex precocity of the isosexual type is present with adult genitalia, pubic hair, deep voice, acne, increased height for age, heavy bony structure, hypertrophied musculature, and hirsutism. Hence, the term "Little Hercules" is applied to these children Early epiphyseal closure occurs, so that while these children are initially tall for their chronological age, they develop into comparatively short men. Spermatogenesis is usually absent. The urinary 17 ketosteroids are increased, however.



A. B.

FIG. 2A, B, C—A, L. A., aged 4½ years. Female pseudohermaphrodite. Note enlargement of clitoris and increase in height. B, shows marked enlargement of clitoris and pubic hair.

These children have a lack of interest in the opposite sex and generally present few psychosexual problems.[20] The prognosis is usually good in boys with the adrenogenital syndrome, since the more common etiology is hyperfunction rather than hyperplasia or neoplasm of the adrenal cortex. The condition, as a rule, resolves itself in later life so that these individuals are indistinguishable from normal adults, except that they may be more muscular and hirsute.

In the female, a heterosexual pseudoprecocity is present. There is an increase in height, hirsutism, deepening of the voice, male configuration, and no mammary development. The internal genitalia are female. The external genitalia are pseudohermaphroditic, manifested by an enlarged clitoris which resembles a hypospadic penis with the urethra opening below the clitoris. Pubic

J. PEDIAT.
VOL. 31, NO. 2, AUG., 1947



FIG. 6.—Case 8. W. A. Inflammatory reddening and swelling with ulceration of the meatus.

CASE REPORTS

CASE 1.—L. A. (*Fig. 2*), *aged 10 years, was noted at birth to have an abnormally enlarged clitoris.* At 8½ months of age, physical examination revealed a well-developed penis with glans and foreskin. There was an associated female urethra with well-developed labial folds and a palpable vagina. At 4 years, 8 months, the clitoris resembled a normal sized penis for a 9-year-old male with complete hypospadias and an urethra which opened in the *normal female position. Posterior to the urethra, there was a vaginal opening.* The vagina and urethra were enclosed in the labia majora. No testes were palpable, either in the labia or in the inguinal canals. X-ray of the skull revealed a sella turcica 40 per cent below average measurements. X-ray of the long bones showed them as short and stocky with an osseous and epiphyseal development of more than double that of the given chronological age. Neurologic examination was negative for signs of any pineal, pituitary, or craniopharyngeal tumors or cysts. Perirenal insufflation and cystoscopy were normal. The twenty-four hour urinary excretion of 17 ketosteroids was 32.9 mg. (normal 2 to 4 mg.).

Laparotomy revealed normal female ovaries, uterus, and Fallopian tubes. No testes were found. The suprarenal glands were normal in position but slightly enlarged. There appeared to be an adenoma of the right suprarenal. The adenoma and one-third of the left suprarenal were removed. The penile organ was amputated after ovarian tissue was demonstrated on biopsies of the ovaries. Postoperatively, the 17 urinary ketosteroids fell to 15.1 mg. per twenty-four hours. After a one-month interval, the ketosteroids rose to 24.6 mg. in twenty-four hours. Two years later, the 17 ketosteroids were 20.3 mg. in twenty-four hours. During the next two-year period, the child became more completely masculine in appearance. There was marked bony and muscular enlargement, acne of the face, deepening of the voice, no mammary development, although the pubic hair was still female in distribution. A vaginogram revealed a normal sized vagina. Psychologically, her interests were masculine. She preferred to play football and indulged in other competitive boys' sports. The urinary 17 ketosteroids, four years after the child was first seen in our clinic, had risen to 112.5 mg. in twenty-four hours.

Case Discussion.—This is a case of a pseudohermaphrodite that obviously originated in utero because the malformation of the genitalia was present at birth. It has been established that cases of this type show a bilateral adrenal cortical hypertrophy. Speculation arises as to whether the hypertrophy is primarily of pituitary origin,[16] since we know that there is an adrenal cortical hormone which maintains the adrenal cortex, and that the integrity of the adrenal cortex depends on this normally functioning adrenotropic hormone. If destruction of the anterior lobe of the pituitary occurs, the adrenal cortex atrophies, and death results. The child was proved to be a female pseudohermaphrodite by laparotomy, which revealed a uterus, ovaries, Fallopian tubes, and the absence of testes. The laparotomy also confirmed the hypertrophy of the adrenal cortices. The question now arises as to why this child, who was subjected to a bilateral subtotal adrenalectomy, should go on to such marked masculinization during the four-year period. The answer is perhaps indicated by the marked increase in the total urinary 17 ketosteroids in the last determination, 112.5 mg. in 24 hours. This marked rise is believed to be generally associated with an adrenocortical neoplasm. Such neoplasms may be located either in the adrenal glands proper, or in an adrenal-cortical rest situated somewhere in the abdomen between the kidneys and the pelvis.[17] The ketosteroids are being fractionated to determine if there are any pathological components present. The

urological clinic and in the relatively rare cases where there was only a pinpoint opening, meatotomy had to be performed.

In the majority of the cases where the skin factor was ammonia dermatitis, the following steps were suggested. The diapers were washed in saturated boric acid solution instead of soap and were not rinsed to obtain the best possible change of the pH from alkaline to acid. Wherever the mothers could afford it, modern neutral soaps were recommended for bathing the children. Otherwise, only boric acid solution was used for this purpose. One to two per cent tar in zinc oxide paste was recommended as a protective film for the diaper regions.



Fig. 7.—Case 7, J. L., fourth attack. Swelling of the secondarily constricted meatus. Labia showing numerous rhagades. About two and one-half times normal size.

As diet corrections, fruit juices were substituted by 50 mg. of ascorbic acid per day and skimmed milk was given. In the cases where the dermatitis described above involved only the periphery of the meatus or the glans and where the skin of the scrotum and thighs were intact, a protecting film with zinc oxide paste containing 3 per cent cod liver oil was found most successful. Herpes simplex dried up quickly after the application of zinc stearate powder as suggested by Brennemann.

COMMENT

Ulceration and coarctation of the urethral meatus is frequently observed in clinics and private practice. Its etiology, however, is still regarded as uncertain, as the following quotations from Brennemann's textbook of pediatrics will show. Campbell, in his chapter on this subject writes: "I believe that in most instances the atresia is congenital and the important predisposing factor." Later on he states: "Moreover, I have seen cases treated by local hygiene and ointments which finally required meatotomy for cure." Brennemann, the author of this book, adds in parenthesis. "It is evident that the urologist sees the ulcerated meatus under conditions that differ from those of the pediatrician. . . . Ulceration of the meatus in circumcised infants of the diaper age is very common. It is practically restricted to artificially fed infants from 5 to 18 months of age, and it is caused by free ammonia on the night diaper. The narrowed

sex was established by laparotomy, the parents refused to consider the child a girl, and as a result the psychological management has become a serious problem.

CASE 3.—G. K. (Fig. 4) was first admitted at 11 days of age for sex determination. The genitalia revealed a small short penis with foreskin insufficient to cover the glans, and no urethral opening. The meatus was located below the penile organ and the scrotal sac was invaginated. The admitting physician reported two testicles palpated in the lower end of both inguinal canals. The diagnosis of complete hypospadias with presence of scrotal tissue was made. Two years later, the child was admitted for operation to repair the hypospadias. At that time, it was stated in the description of the genitalia that no scrotum was present, no testicles were felt, and that there was an absence of the vagina.



Fig. 4.—G. K., aged 2 Male pseudohermaphrodite with marked hypospadias. Note scrotal tissue.

The first stage repair for hypospadias was performed, and the diagnosis at that time was hypospadias with bilateral undescended testicles. The child was readmitted two years later for further operation to correct the hypospadias, but because there still existed some doubt as to the true sex, an exploratory laparotomy was performed. No uterus was seen, but inspection revealed the presence of what appeared to be ovaries and Fallopian tubes. Traction on these structures indicated that the tubes joined in the midline in a membranous diaphragm. The left ovary was considered to be larger than the right. Biopsy of the ovary was taken, and upon examination revealed it to be testicular tissue!

Case Discussion.—This child is a male pseudohermaphrodite. The clinical difficulty one encounters in diagnosing the true sex of these children is again apparent. As previously mentioned, the etiology in this case is probably due to hyperplasia of the adrenal cortex occurring in utero and stresses the importance and necessity of a complete workup before establishing the sex of the individual.

CASE 4.—E. F. (Fig. 5) was apparently normal at birth, but was noted to have enlarged genitalia at about 1 year of age. X ray of the skull at 18 months of age, in another hospital, demonstrated it to be somewhat large in size for the stated age. There was no evidence of

3. Contributing skin factors are: (a) most frequently, ammonia dermatitis, (b) a dermatitis of unknown origin affecting only glans and the periphery of the meatus, (c) herpes simplex.

4. The dangers of obstructive uropathy caused by this disorder have been stressed.

5. Treatment of the disorder has been suggested.

REFERENCES

1. von Bokay, J., Sr.: Gerhards Handbuch der Kinderheilkunde, 1878, vol. 4, p. 189.
2. Sturgis, F. R.: Cyclopedia of the Diseases of Children, 1890, vol. 3, p. 708.
3. Goldenberg, H.: Am. J. Surg. 24: 218. 1910.
4. Southworth, T. S.: Arch. Pediat. 30: 732, 1913.
5. Zahorsky, J.: Am. J. Dis. Child. 10: 436, 1915.
6. Cooke, J. V.: Am. J. Dis. Child. 22: 481, 1921.
7. Brennemann, J.: Am. J. Dis. Child. 21: 38, 1921.
8. von Bokay, J., Jr.: Jahrb. f. Kinderheilk. 99: 303, 1922.
9. Wolbarst, A. L.: Intern. J. Med. & Surg. 37: 37, 1924.
10. Campbell, M. F.: Am. J. Roentgenol. & Rad. Therap. 28: 12, 1932.
11. Campbell, M. F.: Pediatric Urology, New York, 1937, The Macmillan Company, vol. 2, p. 147.
12. Abeshouse, B. S., and Bogorad, D. E.: Urol. & Cutan. Rev. 42: 748, 1938.
13. Hofmann, W.: Schweiz. med. Wchnschr. 70: 142, 1940.
14. Campbell, M. F.: J. Urol. 50: 740, 1943.
15. Brennemann, J.: Practice of Pediatrics, Hagerstown, Md., 1942, W. F. Prior & Company, vol. 3, chap. 30, p. 35.
16. Brennemann, J.: Practice of Pediatrics, Hagerstown, Md., 1942, W. F. Prior & Company, vol. 4, chap. 41, p. 1.
17. Griffith, J. P. C., and Mitchell, A. G.: Philadelphia & London, 1941, W. B. Saunders Company, p. 701.
18. Noeggerat, C., and Eckstein, A.: Pflaundler & Schlossmann, Handbuch der Kinderheilkunde, Berlin, 1935, F. C. W. Vogel, vol. 4, p. 227.
19. Gray, H.: Anatomy of the Human Body, ed. 24, Philadelphia, July, 1944, Lee & Febiger, p. 1254.

CHART I

AGE AND SEX	HYPERFUNCTION, HYPERPLASIA OR NEOPLASM OF THE ADRENAL CORTEX	DIFFERENTIAL DIAGNOSIS
1. In Fetal or Intrauterine Life	*Pseudohermaphroditism* No clear-cut differentiation of external genitalia. The earlier the abnormality, the more marked are the physical and sexual changes.	*True hermaphroditism* An embryological developmental defect, in contrast to pseudohermaphroditism and is not related to abnormalities of the adrenal cortex.
2. Childhood *Boy*	Manifests itself after birth: accentuation of the male characteristics; adult genitalia; pubic hair; initially tall; later, normal or small for age; early closure of the epiphysis; increase of the 17 urinary ketosteroids; isosexual precocity; lack of sexual aggressiveness in boys: condition resolves itself: cause, usually a hyperfunction without hyperplasia.	*Pineal tumors* Occur in boys only, from 4 to 10 years of age: symptoms of intracranial pressure, internal hydrocephalus, failing vision, headache, vomiting; mental precocity and sexual precocity; possibly due to pressure on hypothalamic region; no proof of real pineal hormone: increase of ketosteroids. *Testicular tumors* Occur in boys 4 to 6 years of age; tumor of the interstitial cells; isosexual precocity: evidence of tumor mass present in testicle; increase in ketosteroids. *Cerebral tumors* Involving the floor of the third ventricle or hypothalamus; produce isosexual precocity or precocious puberty with increase in ketosteroids; usually slow growing; symptoms of intracranial pressure.
Girl	Heterosexual pseudoprecocity; pubic hair; enlarged clitoris; hypertrichosis; male configuration; no mammary development; marked increase in 17 neutral urinary ketosteroids; no menstruation; prostate may be found, and aberrant adrenal cortical tissue; prognosis poor for normal sexual function.	*Granulosis cell tumors of the ovary* True isosexual precocity; enlargement of the breasts; pubic hair; menstruation; marked increase in urinary estrogens; tumor mass present. *Cerebral tumors* Early isosexual precocity; evidence of intracranial pressure; slow growing; normal urinary estrogens; enormous breast enlargement. *Sex precocity* May occur early in females, usually of unknown cause. Albright's syndrome, sex precocity in girls only; osteoporosis and skin pigmentation.
Cushing's Syndrome	Signs of Cushing's syndrome may occur in both sexes associated with the adrenal genital syndrome. Among the symptoms are: obesity, hypertension, glycosuria, osteoporosis, cyanosis, plethora, metabolic changes and disturbance in the carbohydrate metabolism; etiology, usually a malignant tumor of the adrenal cortex; prognosis poor.	

activate the anterior lobe of the pituitary gland, particularly its gonadotropic hormone, which secondarily stimulates the gonads to secrete sex hormones. More recently, some observers[3] have expressed the opinion that there exists a sex center in the posterior hypothalamus, and that tumors in and around the third ventricle, and those of the pineal gland, act by secondary pressure on this center. Through neural or neurohumeral means, the anterior pituitary gland is activated.

CASE SUMMARY

The cerebral or hypothalamic group is exemplified by a case previously reported[4] in a female child (Fig. 1), 3 years and 2 months of age, admitted with the complaints of inability to talk, walk, and stand, or use the right arm or leg. Physical examination revealed a well-developed and nourished child showing evidence of adiposity and premature sexual development, large mature breasts, external genitalia comparable to those of a child at the age of puberty, and sparse pubic hair. A right hemiparesis, marked ankle clonus of the right foot, and bilateral optic atrophy were also noted. A ventriculogram showed a large mass filling the region of the third ventricle, with an enlarged ventricular cyst on the left and an internal hydrocephalus. A craniotomy was done, the third ventricle was entered, and the cyst was incised, cauterized, and removed. Postoperatively, the child showed signs of improvement. She was brighter and recognized people, her entire behavior pattern improved, and there was some regression of the genitalia and slight atrophy of the breasts.

Tumors of this type, including pinealomas, always produce an isosexual precocity. These tumors are evidenced by intracranial pressure, failing vision, vomiting, headache, and internal hydrocephalus. This condition progresses slowly and usually produces a true precocious puberty. The age incidence is later than those of the endocrine type. When these conditions occur in the female child, the urinary estrogens are increased. In the male, there is an increase in the urinary androgens, but not to the extent that is present in the adrenogenital syndrome. This is a helpful differential point between the two conditions. To sum up, an isosexual precocity in a child with signs of increasing intracranial pressure should lead one to suspect a tumor in or about the hypothalamic region.

II. The Endocrine Group.—

Before discussing the endocrine group in detail, a brief review of the recent advances in the metabolism of the steroid hormones should prove of great interest and value. The identification and evaluation of these steroid hormones and their component fractions have been of enormous help in the differentiation of the various types of sex precocity.

Normally, males and females excrete both androgenic and estrogenic compounds in the urine. The urinary androgenic-estrogenic relationship is an index of the degree of masculinity and femininity of the individual. These hormones originate both in the gonads and in the adrenal cortices. Some of the adrenal cortical and testicular hormones are converted into neutral 17 ketosteroids, and excreted in the urine. The 17 ketosteroids found in the urine are of two types, the phenolic, and the nonphenolic, or neutral fraction. The urinary products of androgen metabolism are present in the nonphenolic or neutral fraction. Callow and co-workers[5] applied the term

SERUM PRECIPITABLE IODINES IN RECOGNITION OF CRETINISM AND IN CONTROL OF THYROID MEDICATION

EVELYN B. MAN, PH.D., CHARLES S. CULOTTA, M.D.,
DOROTHY A. SIEGFRIED, B.S., AND CARTER STILSON, M.D.
NEW HAVEN, CONN.

IT HAS been suggested that irrevocable damage occurs in children by the time clinical symptoms of cretinism become complete. Recognition of thyroid hypofunction before all symptoms develop would permit earlier thyroid medication. Our data have been examined to learn whether or not the measurement of serum precipitable iodine is useful in the diagnosis of cretinism and in the differential diagnosis between cretinism and mongolism. Serum precipitable iodines and cholesterols have been compared as to their usefulness in the diagnosis of cretinism. Six cretin children have been studied after treatment with desiccated thyroid.

EXPERIMENTAL SUBJECTS AND METHODS

The subjects were boys and girls 6 weeks to 16 years of age. All of them were seen on the pediatric wards or in the Pediatric Clinic. Before blood studies were made in the nine cretin children, there was no great question, clinically, as to the diagnosis, except for one more doubtful case. The clinical diagnosis was based on the usual criteria for cretinism: retarded mental and physical development; retarded bone age by x-ray; umbilical hernia; enlarged tongue; thickened skin and coarse hair; constipation, and poor feeding history. All these symptoms appeared to a high frequency in the children presented. One patient had also severe cardiac decompensation which has since cleared completely. Iodines were determined in the serum of seventy-two noncretin children, in the effort to exclude the possibility of thyroid dysfunction; in these children no true criteria of hypo- or hyperthyroidism were demonstrable. Though some had low basal metabolic rates or were obese, these signs were not considered indicative of hypothyroidism. Some children were mentally retarded. Some were suspected of hyperthyroidism because of tachycardia, unexplained fever, or failure to gain in weight. Eleven had simple, nontoxic goiters. Eight were malnourished.

Serum iodines were determined by the Riggs and Man[1] permanganate acid ashing method. It has now become a routine technique to precipitate duplicate 6 c.c. portions of serum with zinc sulfate and sodium hydroxide.[2] With the precipitated proteins, the hormonal iodine seems to be included, while the inorganic iodine remains in filtrate and washings. Some of the older determinations

From the Departments of Psychiatry and Pediatrics, Yale University School of Medicine.
Some of the data included in this paper have been offered for presentation at the meetings of the Federation of American Societies for Experimental Biology in May, 1947, in Chicago, Ill.

Further fractionation of the ketosteroids into the alpha and beta fractions, has been of value in determining pathological states. According to Soffer,[9] in the urine of normal men and women these compounds have been isolated: androsterone, dehydroisoandrosterone, 3-a-hydroxy-etiocholane-17-one, pregnanediol, and estrogens. In hyperfunction, either due to hyperplasia or tumors of the adrenal cortex, additional pathological fractions isolated are: delta 3,5,-androstadiene-17-one, pregnanediol, pregnane-3,17,20-triol, and 3-a-hydroxy-androsten-17-one.

Dorfman and associates[10] isolated an androstenol-3 (alpha)-17-one, an androgen, from the urine of a girl suffering from virilism. This was identical to the compound isolated by Wolfe and co-workers[11] from the urine of a 10-year-old girl suffering from malignant adrenocortical tumor.

Not only are the total excretions of the 17 urinary ketosteroids increased in hyperfunction of the adrenal cortex, but also, certain pathological fractions have been isolated that are not present in normal urine. The highest excretion is found in adrenocortical neoplasm, as previously mentioned. Low excretion of 17 ketosteroids occurs in malnutrition, anemia, and may entirely disappear in Addison's disease.

The endocrine group includes those conditions where a hyperfunction, hyperplasia, or a neoplasm of the testicular, ovarian, or adrenal cortical cells exists. It is interesting to note that these organs involved have a common embryological origin and that they all secrete steroid hormones.

In boys, involvement of the testes causing sex precocity is usually due to a teratoid embryoma or an adenoma of the interstitial cells. These occur most commonly from the ages of 3 to 6 years. They produce an isosexual precocity. There is usually a palpable tumor mass and a slight increase of the urinary 17 ketosteroids. In girls, granulosa cell tumors of the ovary are often found, rarely teratoid embryomas or chorioepitheliomas. These produce an isosexual precocity, and may manifest themselves by either sex precocity or precocious puberty. Large amounts of estrogenic hormones are excreted in the urine. An enlargement of the abdomen is present, and a tumor mass may be palpated. Surgical removal of the mass will cause regression of the symptoms. There are other instances of sex precocity in girls for which no definite etiology can be determined, even after exhaustive study. The Albright[12] syndrome is included in the endocrine group. This is a condition in which there is sex precocity in girls, osteoporosis, and pigmentation of the skin.

THE ADRENOGENITAL SYNDROME

In disturbances of the adrenal cortex due to hyperfunction, hyperplasia, or neoplasm, there are three age groups in which the syndrome may manifest itself: in utero, in childhood, and in adult life. There is a familial tendency to sexual abnormalities in the adrenogenital group.[13]

When the onset of the syndrome occurs in utero, pseudohermaphroditism is present without any clear-cut differentiation of the external genitalia. Determination of the sex is then difficult because of the malformations. It has been established that the majority of these cases, however, are female.

Only one subject, a cachectic child with anorexia nervosa, had a clearly subnormal value, 2.4 gamma per cent. Later, after gavage feeding without thyroid medication, the serum precipitable iodine rose spontaneously to 4.2 gamma per cent.

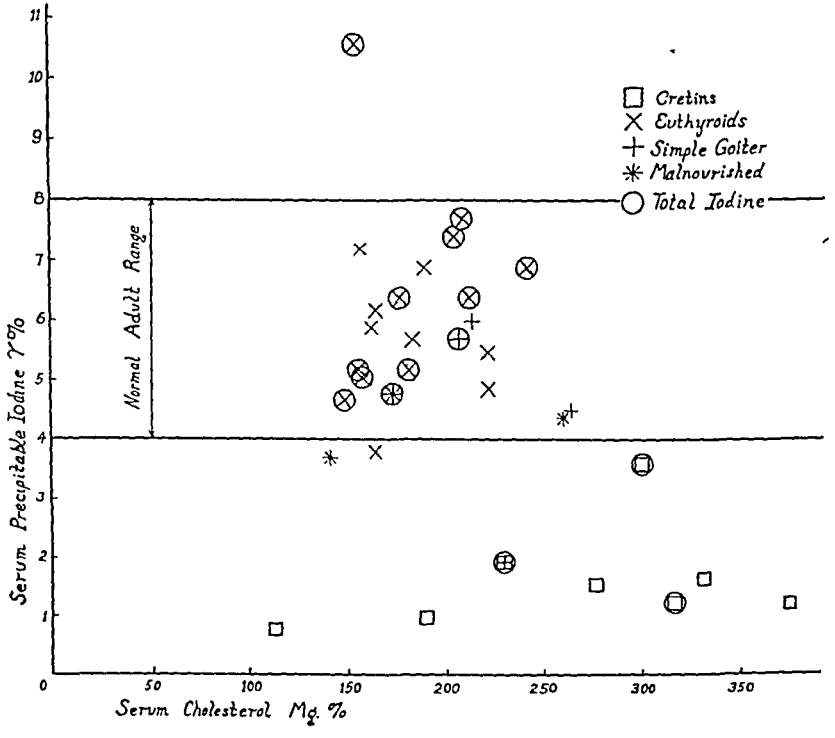


Chart 2.—Serum precipitable iodines and serum cholesterols of eight cretin and twenty-four noncretin children.

The horizontal guide lines represent the normal range for serum precipitable iodines of euthyroid adults, 4.0 to 8.0 gamma per cent.[5] Vertical guide lines for the normal range of serum cholesterol have not been drawn. In our own previous studies on euthyroid children when iodines were not determined, fifty-three boys and girls between the ages of 5 and 14 had cholesterols ranging between 114 and 296 mg. per cent.[6] Macy[7] has reported that serum lipid values may be low in young children. The cretin children ranged in age from 1 to 12 years. It would be impossible to draw any one line representing the maximum normal cholesterol for such a mixed age group. From available data[6-13] any cholesterol value above 250 mg. per cent might be considered above normal, but distinct elevation of the serum cholesterol could not be granted below 300 mg. per cent.

All values on the nine cretin children in Chart 1 were subnormal. In fact, with the exception of one less accurate total iodine, all values fell below 2.0 gamma per cent. None of these children except one had been treated with desiccated thyroid for at least four weeks prior to the measurement of serum iodine. Clinically recognizable cretinism is therefore accompanied by a distinct decrease in the serum precipitable iodine. Conversely, in many clinical conditions studied, with the exception of the one cachectic child, all low serum precipitable iodines occurred in cretin children.

In Chart 2 are shown the serum iodines and cholesterols of the children in Chart 1. The same symbols are used as in the first chart. Both iodine and

hair appears early but is usually female in distribution. A prostate may be found. The vagina is not completely descended and often opens into the urethra. The child resembles a cryptorchid boy. Menstruation does not occur. The 17 ketosteroids are markedly increased and are in far greater excess than in the boy with the same syndrome. The prognosis for a normal sexual life is doubtful.

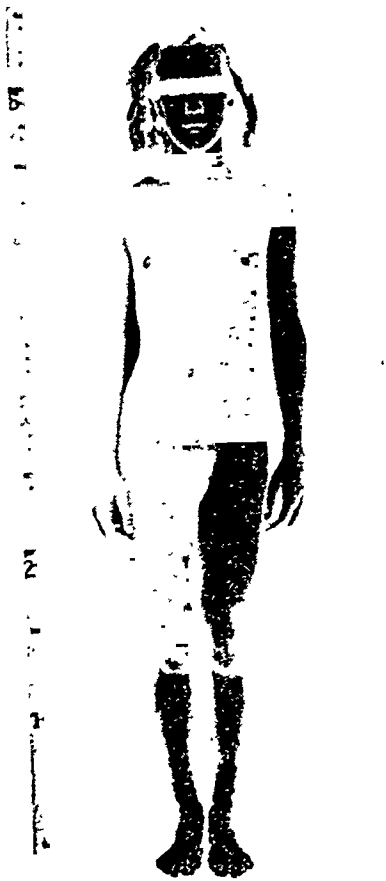


Fig. 2C.—Same child at 10 years of age. Note masculine configuration. Clitoris has been amputated.

An androgenic zone[14] normally exists in the fetal adrenal gland and due to some pathological condition, possibly pituitary overstimulation, it may persist throughout childhood. The masculinizing hormone is believed to originate in this androgenic zone. The hyperfunction of the adrenals that occurs in the female pseudohermaphrodite is caused by hyperplasia of the cells in this androgenic zone. Grollman[15] states that there is a marked difference in function between these cells and other portions of the adrenal cortex which control electrolyte balance, i.e., the inter-renal cells. Encroachment of the androgenic zone on the inter-renal cells might lead to Addison's disease with pigmentation, weakness, and often death.

In Chart 3 are presented some of the data concerning the response of six of the cretin children, mentioned previously, to thyroid medication. Only six children have been included because no adequate follow-up work has been conducted on three. Clinically, the outstanding fact about these six children is that one had responded quite satisfactorily to administration of desiccated thyroid and two had not responded completely. These two are the third and fifth on the chart. These are the two whose serum precipitable iodines, after desiccated thyroid, were lowest. The first child on the chart is the one who, clinically, has responded in such a satisfactory manner. Her serum iodine has risen to the normal range. As was pointed out in Chart 3, brief changes in thyroid dosage were omitted. This omission prevented showing the initial response of the serum precipitable iodines. In two of the babies the iodine rose markedly at first, and then after a couple of weeks or a few months leveled off or fell. Measurement of serum iodine after a short period of time is consequently not conclusive as to whether thyroid dosage is adequate.

DISCUSSION

The data concerning cretin children are open to criticism because the range of values for serum precipitable iodine in normal infants and children has not been established. Talbot,[14] with a micromethod, reported the serum precipitable iodines of thirty-nine children 3 to 13 years of age as varying between 4.0 and 7.0, with an average value of 5.5 gamma per cent. In eleven "normal young adults" iodines ranged between 6.0 and 8.4, with an average of 7.0 gamma per cent. In four cases of "juvenile hypothyroidism or cretinism," iodines varied between 1.8 and 3.0 with an average of 2.3 gamma per cent.

With our iodine method, at least 25 c.c. of blood is necessary at present for the measurement of serum precipitable iodine. Some of the infants studied have required transfusions after blood was drawn for the determination of serum iodine. Such heroic measures have not seemed justified as yet in order to define the range of values in normal infants. It is still a question whether the newborn infant may not have a higher normal serum iodine than the older child, since during normal pregnancy the mother has a higher serum iodine than normal nonpregnant women. It has been found in this laboratory that the average serum iodine of sixteen pregnant females was 8.4 gamma per cent, while the average for nonpregnant women was 5.6, plus or minus 1.3 gamma per cent.[5] Cord blood of two newborn infants had serum precipitable iodine contents of 7.3 and 10.0 gamma per cent.

Our values on noncretin children were collected from boys and girls in whom thyroid dysfunction was suspected. Some of their clinical symptoms were described earlier. Their iodine values may not be representative of children who develop normally. There are insufficient data to attempt any differentiation between boys and girls. The determinations on infants are too few to show whether the iodine level changes as the infant develops. Furthermore no single child has been followed during growth. With three exceptions, all the serum precipitable iodines of the seventy-two noncretin children fell within the same range as for euthyroid adults, 4.0 to 8.0 gamma per cent.

child is also being subjected to further intensive workup, and tests are being repeated for location of a suspected tumor. She is being treated with estrogenic hormone at present, and an enlargement of the breasts has been noted.[18-19]

CASE 2.—L. T. (Fig. 3), aged 10 years, whose sex at birth could not be determined, was first seen in our clinic at 5 months of age. Examination at that time revealed a well-formed penis and labia. It was felt that the child was a boy with a hypospadias. No testicles were palpated. The child was given A.P.L. (anterior pituitary-like) hormone without apparent results except for an increase of penile growth and the appearance of pubic hair. Male hormones were then added to the therapy. At 4 years of age, it was decided to do plastic repair of the hypospadias, and to free the penis, which was found adherent on its undersurface. At that time the penis was 4 cm. long. Plastic reconstruction was begun, and when the child was admitted for the second stage of this repair, a tumor of the right breast was noted. In all, there were six admissions for surgical repair of what was believed to be a complete hypospadias. At 10 years of age, the child was readmitted for an exploratory operation for undescended testicles. It was noted at that time that the child's breasts were tender and enlarging, and that there was a complaint of lower abdominal pain. At operation, bilateral ovaries (confirmed by biopsy), uterus, and Fallopian tubes were found.



Fig. 3.—L. T., female pseudohermaphrodite aged 4, showing enlargement of clitoris and presence of labia and pubic hair

Case Discussion.—This is another instance of a female pseudohermaphrodite, on whom, unfortunately, the diagnosis was not made earlier because of the failure to do an exploratory laparotomy, and also because at that time the 17 ketosteroid determinations had not been developed. It is important to stress the fact that when the sex cannot be readily determined, an exploratory laparotomy must be performed. This child was reared as a boy, underwent plastic surgical repair, and was given male hormone therapy. As a result, the child has been masculinized both psychologically and endocrinologically and brought to puberty earlier than the chronological age would warrant. When the true

has been tentatively ascribed to a possible irreversible central nervous system defect,[16] but it may be that this development can be furthered by the use of serum precipitable iodine determinations in the control of medication.

CONCLUSIONS

Serum precipitable iodines were below normal adult values usually less than 2.0 gamma per cent in nine cretin children ranging from 3 months to 12 years of age. Only one of seventy-two noncretin children, a patient with anorexia nervosa, had a serum precipitable iodine distinctly below 4.0 gamma per cent.

Measurement of serum precipitable iodine is more reliable than evaluation of serum cholesterol in the diagnosis of cretinism.

The clinical response in relation to the level of serum precipitable iodine after administration of different doses of desiccated thyroid has been discussed.

REFERENCES

1. Riggs, D. S., and Man, E. B.: J. Biol. Chem. 134: 193, 1940.
2. Man, E. B., Smirnow, A. E., Gildea, E. F., and Peters, J. P.: J. Clin. Investigation 21: 773, 1942.
3. Man, E. B., and Peters, J. P.: J. Biol. Chem. 101: 685, 1933.
4. Bogdanovitch, S. B., and Man, E. B.: Am. J. Physiol. 122: 73, 1938.
5. Heinemann, M., Johnson, C. E., and Man, E. B.: Elevation of Serum Precipitable Iodine During Pregnancy. Program 38th Annual Meeting American Society for Clinical Investigation, May 27, 1946, Atlantic City, N. J.
6. Man, E. B., Gildea, E. F., and Culotta, C. S.: Unpublished data.
7. Macy, I. G.: Nutrition and Chemical Growth in Children, vol. 1, Springfield, Ill., 1942, C. C. Thomas.
8. Bruch, H.: Am. J. Dis. Child. 58: 1001, 1939.
9. Offenkrantz, F. M., and Karshan, M.: Am. J. Dis. Child. 52: 784, 1936.
10. Page, I., Kirk, E., Lewis, W., Thompson, W., and Van Slyke, D.: J. Biol. Chem. 111: 613, 1935.
11. McQuarrie, I., and Stoesser, A. V.: Proc. Soc. Exper. Biol. & Med. 29: 1281, 1932.
12. Stoesser, A. W., and McQuarrie, I.: Am. J. Dis. Child. 49: 658, 1935.
13. Stilson, C.: The Effect of Choline Administration on the Levels of Blood Cholesterol and Blood Sugar. A thesis presented to the Faculty of the Yale University School of Medicine in candidacy for the degree of Doctor of Medicine, 1942.
14. Talbot, N. B., Butler, A. M., Saltzman, A. H., and Rodriguez, P. M.: J. Biol. Chem. 153: 479, 1944.
15. Winkler, A. W., Riggs, D. S., and Man, E. B.: J. Clin. Investigation 24: 733, 1945.
16. Bruch, H., and McCune, D. J.: Am. J. Dis. Child. 67: 205, 1944.

intracranial tumor. The sella turcica was normal in size and shape. The diagnosis at that hospital was macrogenitosomia praecox and premature puberty. X-ray of the bones showed markedly advanced bone age. Exploration of the adrenals was done one year later, and showed no evidence of malignancy. Biopsy of the rib, testes, and epididymis was also negative for malignancy.

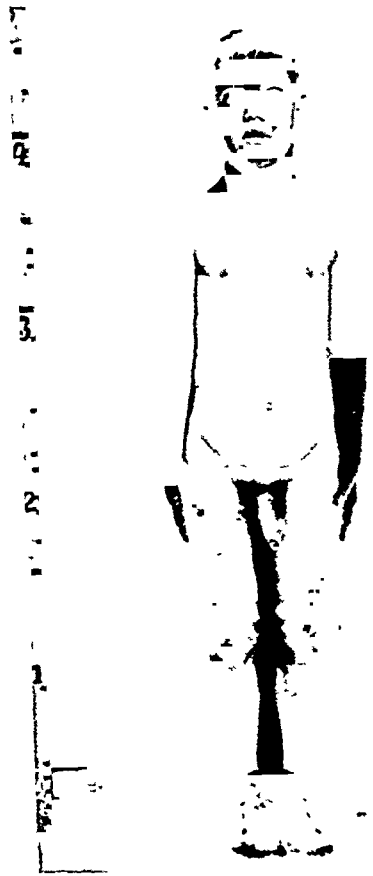


Fig. 5.—E. F., 4½ years of age. Adrenogenital syndrome in a boy with increased masculinization and adult genitalia ("Little Hercules").

He was seen at our clinic at 4½ years of age. He weighed 75½ pounds, and was 4 feet, 3¾ inches tall, which was twice the size for his age. He was well proportioned, quite muscular, with adult genitalia, but no prostatic enlargement. Pubic hair, deepening of the voice, and acne of the face were present. His mental development was superior. The basal metabolic rate was plus 8, and the urinary 17 ketosteroids were 9.2 mg. in twenty-four hours (normal for this age is less than 5 mg. per twenty-four hours). He is being followed in the clinic at present, attends school, and is in his proper grade. The school was originally fearful of admitting this child, but he is adjusting very well to the classroom situation and has shown no abnormal interest in the opposite sex.

Case Discussion.—It is our impression that we are dealing with a case of the adrenogenital syndrome due to hyperfunction in a boy, manifested by increased masculinization, giving the so-called "Little Hercules" type. The absence of

SELECTION OF PATIENTS

Ninety-four children (forty-seven test patients and forty-seven control patients) were selected for this study on the basis of their nutritive status, freedom from acute and clinically apparent infectious disease, and economic background. The test group was composed of twenty boys and twenty-seven girls, ranging in age from 5 to 15 years, each of whom had a history of previous or existing nutritional deficiency disease. These children came for the most part from rural families whose incomes were insufficient to allow an adequate diet most or all of the time. By contrast, the control group of twenty boys and twenty-seven girls, ranging in age from 5 to 14½ years, were all free from nutritional deficiency diseases at the time of their selection. The children in this group came from urban families whose incomes were high enough to supply adequate amounts of dietary essentials at all times. The ninety-four children were all natives of north central Alabama, a region where nutritional deficiency diseases are endemic.

METHOD OF STUDY

All children were brought to the clinic for a medical examination at least four times each calendar year. In most instances, many more examinations were made, especially during the spring and summer months. None of the children received vitamin, mineral, or supplemental dietary therapy at any time during the two years. A record of all manifestations of nutritive failure and acute infectious disease was kept for each child. The chronological age, height, and weight of each child was recorded at each visit, and these data were plotted on the Wetzel Grid. The nutritive value of the diet was estimated once each year from diet records of food intake for one week. These diet histories were all taken in so far as possible at the same time of year.

OBSERVATIONS

The findings of the physical examinations appear in Table I. In the test group every child except one showed some signs or symptoms suggesting nutritional deficiency disease during the two-year period of study. In the control group only one child, a boy with photophobia and glossitis, had evidence of nutritional deficiency disease. The control group, however, appeared to be more susceptible to acute infectious diseases (probably because of their urban environment), since ten girls and thirteen boys were affected as compared with only two boys and six girls in the test group. Allergic responses to particular foods were reported for four children in the test group and three children in the control group. Asthma became acute in one child in the test group and two children in the control group during the period of the study, and one child in the test group developed hay fever. Five of the children in the test group passed worms of undefined types at one time or another during the two years. No similar condition was reported by any children in the control group.

When the dietary information was assessed,* it was noted that a definite and easily discernible difference existed between the diets of the two groups in re-

*Recommendations of National Research Council.

psychosexual behavior difficulties is, as mentioned,[20] characteristic. The slight increase in the urinary 17 ketosteroids is also compatible with the diagnosis. This boy is at present receiving no medication, but he is being observed and retested from time to time. It is felt that this child will develop into a normal adult of relatively short stature and that this condition will be self-limited.

SUMMARY

In summary, the following chart is presented which may help to provide a rapid method of differentiating cases of sex precocity and the adrenogenital syndrome.

CONCLUSION

A discussion, case summaries, and a differential diagnostic table of sex precocity and the adrenogenital syndrome have been presented, with an account of 17 urinary ketosteroids. It is hoped that this will be of value in the recognition and management of these abnormal, unfortunate individuals and that the tragic mistakes made in the past may be obviated by a knowledge of the procedures employed and the newer tests utilized in the differentiation of these cases.

I am indebted to Dr. Alfred B. Amler and Miss Virginia States for their assistance in the preparation of this paper.

REFERENCES

1. Young, H. H.: Congenital Abnormalities, Hermaphroditism, and Related Adrenal Diseases, Baltimore, 1937, Williams & Wilkins Company.
2. Seckel, H. P. G.: Med. Clin. North America 30: 183, 1946.
3. Weinberger, L. M., and Francis G. Grant: Arch. Int. Med. 67: 4, 1941.
4. Scotti, D. W.: N. Y. State J. Med. 39: 12, 1939.
5. Callow, R. K.: Proc. Roy. Soc. Med. 31: 841, 1937-38.
6. Talbot, N. B., and Butler, A. M., Berman, R. A., Rodriquez, P. M., and MacLachlan, E. A.: Am. J. Dis. Child. 65: 364, 1943.
7. Engstrom, W. W., Mason, H. L., and Kepler, E. J.: J. Clin. Endocrinol. 4: 152, 1944.
8. Zimmermann, W.: Ztsch. f. physiol. Chem. 245: 47, 1936.
9. Soffer, L. J.: Diseases of the Adrenals, Philadelphia, 1946, Lea & Febiger.
10. Dorfman, R. I., Schiller, J., and Sevringhaus, E. L.: Endocrinol. 37: 262, 1945.
11. Wolfe, Foeser, and Friedgood, H.: J. Am. Chem. Soc. 63: 582, 1941.
12. Albright, F., Butler, A. M., Hamptom, A. O., and Smith, P.: New England J. Med. 216: 727, 1937.
13. Wilkins, L., Fleishmann, W., and Howard, J. E.: Endocrinol. 26: 394, 1940.
14 and 15. Grollman, A.: The Adrenals, Baltimore, 1936, Williams & Wilkins Company.
16. Talbot, N. B., Butler, A. M., Berman, R. A.: J. Clin. Investigation 21: 559, 1942.
17. Fibiger, J.: Arch. f. Path. Anat. 181: 1, 1905.
18. Lisser, H.: Endocrinol. 27: 385, 1940.
19. Dorfman, R. I., Wilson, H. M., and Peters, J. P.: Endocrinol. 27: 1, 1940.
20. Seckel, H. P.: Med. Clin. North America 30: 194, 1946.

TABLE II. NUTRITIONAL INADEQUACY OF THE DIETS OF FORTY-SEVEN TEST AND FORTY-SEVEN CONTROL CHILDREN

	TEST GROUP						CONTROL GROUP					
	GIRLS		BOYS		TOTAL		GIRLS		BOYS		TOTAL	
NUTRIENT	B*	D†	B	D	B	D	B	D	B	D	B‡	D
Protein	8	13	4	12	12	25	1	1	0	0	1	1
Riboflavin	4	12	2	14	6	26	2	0	0	0	2	0
Thiamin	5	4	3	2	8	6	5	0	0	0	5	0
Niacin	4	9	3	9	7	18	2	0	0	0	2	0
Calcium	2	10	4	11	6	21	2	0	0	0	2	0
Phosphorus	2	9	2	7	4	16	1	0	0	0	1	0
Iron	6	8	4	5	10	13	3	0	1	0	4	0
Vitamin C	5	5	2	8	7	13	1	0	0	0	1	0
Vitamin A	3	6	3	6	6	12	1	0	0	0	1	0

*B=Borderline adequacy—values which hovered about the recommended allowance.
†D=Deficient—values below recommended allowance.
‡The borderline deficiencies were distributed among five children in the control group.

Figs. 1, *A*, *B*, and *C* compare graphically the different physique channel positions reached by the subjects at one time or another during the period of study. It was noted that the peak of the distribution of physique channels attaincd by the children in the control group centered in both the A_1 and M channels, while that attained by the children in the test group appeared in the B_1 channel. On the basis of sex, the peak of distribution for each group appeared as follows: boys in the control group, A_1 channel; boys in the test group, M channel; girls in the control group, B_1 channel; girls in the test group, B_2 channel. In general, therefore, the children in the control group appeared in the physique channel on the Wetzel Grid immediately to the left of that of the corresponding test group.

Table III reveals the tendency of the majority of children in both groups to change physique channels frequently during the course of study. The children in the test group averaged 2.3 different physique channels and 3.6 total physique channels per child in contrast to 2.0 different physique channels and 2.5 total physique channels per child in the control group. The children in the test group appeared to have more erratic growth progress than those in the control group. Although this did not of itself answer the question as to

TABLE III. COMPARISON OF THE NUMBER OF DIFFERENT PHYSIQUE CHANNELS* (WETZEL) AND THE NUMBER OF TOTAL PHYSIQUE CHANNELS† (WETZEL) FOLLOWED BY FORTY-SEVEN TEST CHILDREN AND FORTY-SEVEN CONTROL CHILDREN IN A TWO-YEAR PERIOD

	NO. DIFFERENT PHYSIQUE CHANNELS				NO. TOTAL PHYSIQUE CHANNELS					
GROUP	1	2	3	4	1	2	3	4	5	6
Test boys	0	12	7	1	0	3	6	4	6	1
Test girls	3	17	7	0	3	8	4	5	5	2
Total	3	29	14	1	3	11	10	9	11	3
Control boys	5	10	3	2	5	5	6	3	1	0
Control girls	6	19	2	0	6	10	6	4	1	0
Total	11	29	5	2	11	15	12	7	2	0

*"Different" refers to the number of dissimilar physique channels in which the child appeared during the test period; e.g., if a child passed from A_1 to M and back to A_1, the total would be two different physique channels.

†"Total" refers to the number of channels in which the child appeared during the test period, taking into consideration the possibility of his appearing in a given channel more than one time; e.g., if he passed from A_1 to M and back to A_1 the total would be three physique channels.

of serum iodine were made on serum without precipitation and are called "total iodines." Values of total iodine, due to the inclusion of inorganic iodine, are subject to positive error, which usually does not exceed one gamma per cent unless the patient has received inorganic iodine. In the charts total iodines are designated differently than precipitable iodines. In a couple of instances when total iodines were determined, insufficient blood could be obtained from the child to permit duplicate 6 c.c. aliquots of serum. In one instance only 2.5 c.c. aliquots were used. Iodines determined on small aliquots of serum are of course open to a larger experimental error than determinations on the usual quantity of serum. These values on small aliquots have not been designated in the charts because this difficulty arose so rarely. Of the eighty-one initial determinations of serum iodine, fifty-seven measurements were of precipitable iodine and twenty-four samples were total iodines.

Serum cholesterols were evaluated by a gravimetric digitonin procedure.[3, 4]

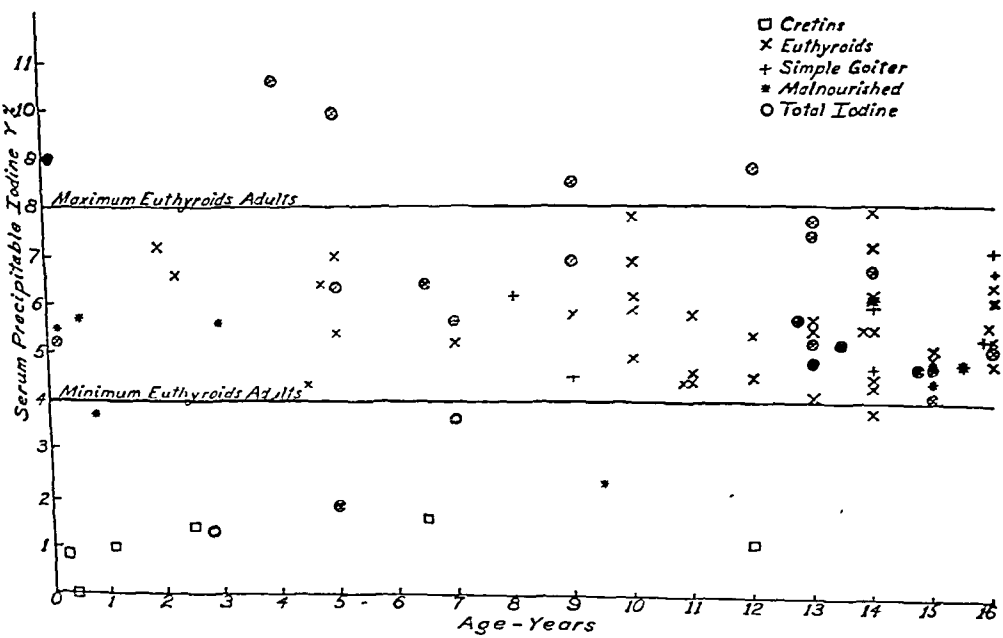


Chart 1.—Serum precipitable iodines and ages of nine cretin and seventy-two noncretin children, 6 weeks to 16 years of age.

RESULTS

In Chart 1 are presented the ages and serum iodines of the nine cretin children and of the seventy-two noncretin children. Each point on the chart represents a different child. Except for five slightly high total iodines (the positive error of which has already been discussed) all but three of the serum precipitable iodines of the noncretin children fell within 4.0 to 8.0 gamma per cent, the range which has been defined for euthyroid adults.[5] Of the three exceptional values, two differ from normal by less than the experimental error of the method.

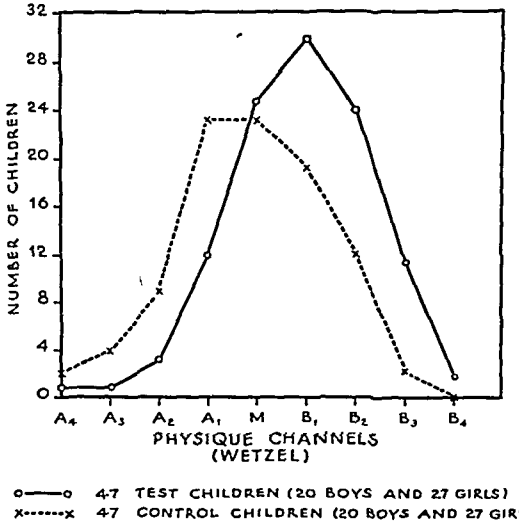


Fig. 1A.

Fig. 1A.—Graph showing the differences in the physique channels followed by the children in the test group and those in the control group during the two-year period. The children in the control group centered within the A_1 and M channels, and the children in the test group centered within the B_1 channel.

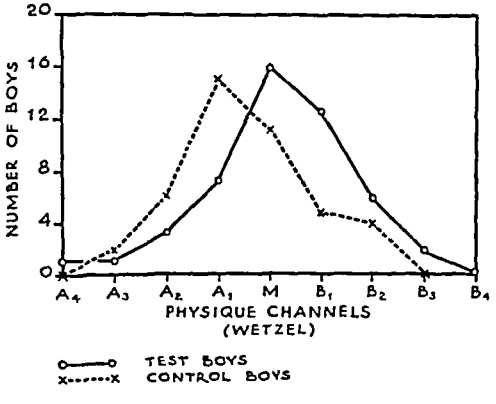


Fig. 1B.

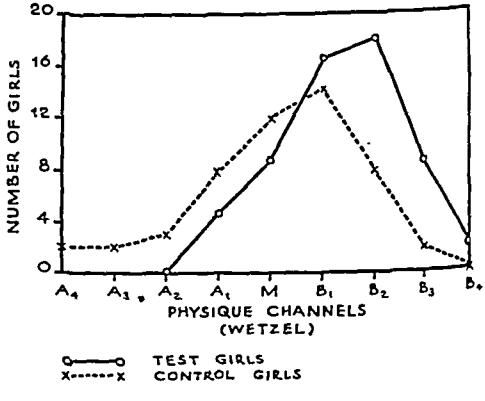


Fig. 1C.

Fig. 1B.—Graph showing the comparison of the physique channels followed by the boys in the test and control groups during the two-year period. The boys in the control group centered within the A_1 channel, and those in the test group centered within the M channel.

Fig. 1C.—Graph showing the comparison of the physique channels followed by the girls in the test and control groups during the two-year period. The girls in the control group centered within the B_1 channel, and those in the test group centered within the B_2 channel.

cholesterol were determined simultaneously in only eight of the cretin children and twenty-four of the noncretin children of Chart 1. Seven of the cretin children had not had desiccated thyroid for at least six weeks preceding the blood study; one of them had been on small amounts of desiccated thyroid. Of eight cretin children, three had serum cholesterols below 250 mg. per cent and only three had serum cholesterols above 300 mg. per cent. On the other hand.

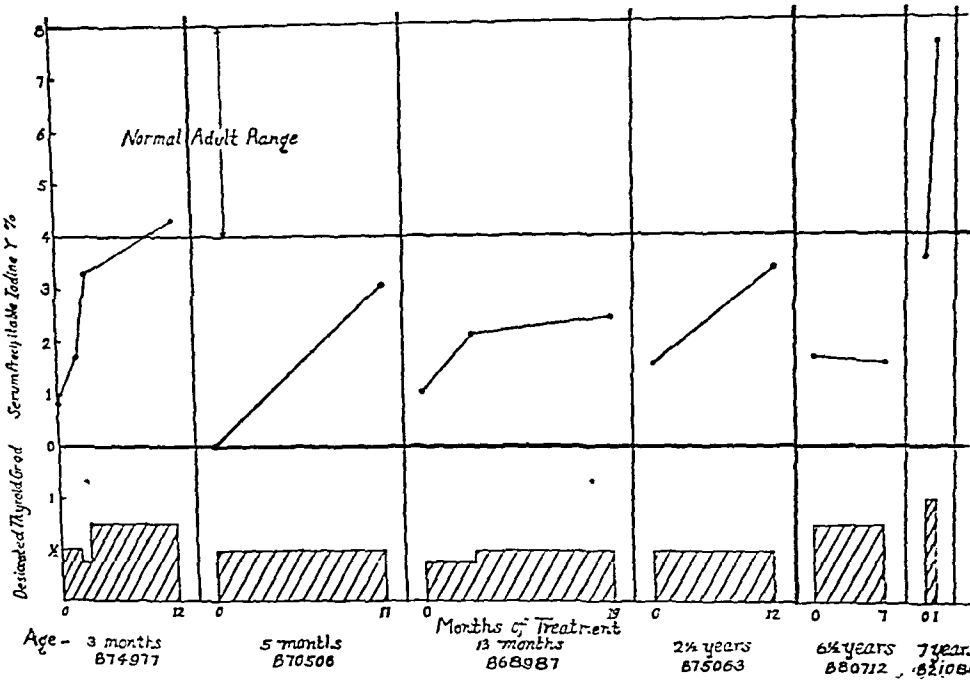


Chart 3.—Serum precipitable iodines in relation to medication with desiccated thyroid of six cretin children.

At the bottom of this chart is given the age of the child at the time of the initial iodine, when the child had not been treated with desiccated thyroid. The children are arranged in order of age when the first precipitable iodine was measured. Above the initial ages are shown the doses of desiccated thyroid per day with the duration of treatment indicated in months. Thus the total period of treatment for the first child is 12 months. No change in dosage is illustrated unless the dosage had been maintained for at least one month. When some of the children were started on desiccated thyroid, changes in the dosage were made after a few days in relation to clinical symptoms. These changes are not included. Above the thyroid dosage are given the serum precipitable iodines.

all the iodines fell at or below 2.0 gamma per cent with the exception of one total iodine. It is at once obvious that the measurement of serum cholesterol is less reliable than the estimation of serum precipitable iodine in the diagnosis of cretinism in children. It might be pointed out that the two lowest cholesterols were found in the two youngest children. The 3-month-old child had a cholesterol of 113, and the one-year-old child a cholesterol of 190 mg. per cent. Even if the serum cholesterol of infants is lower normally than that of older children, neither of these values is sufficiently elevated to aid in the diagnosis of cretinism. Therefore, while an elevated serum cholesterol is of value diagnostically, a cholesterol below 250 mg. per cent does not exclude the possibility of cretinism.

manifested by twenty-eight children in the test group would appear to have some significance, since, in the main, they shifted toward the less favorable part of the optimal physical status grouping.

The evaluation of the changes in the physical status of the two groups of children during the period of investigation is shown in Table V. In the Grid technique, "evaluation of physical status involves the study, measurement, and interpretation of physique or body build, developmental level, and nutritional grade."[7] Taking all three factors into consideration, it was observed that twenty-six children in the test group underwent what would appear to be a detrimental change of physical status, four showed improvement, and the remainder tended to be unchanged. It would seem that in the latter group advantageous changes in one component were offset by deleterious changes in another, with the result that there was no apparent effect on the general physical status of the child. By contrast, ten children in the control group underwent a detrimental change, eight showed improvement, and the remainder were unchanged. The combination of all three factors into a single expression of physical status tended to obscure the tortuous nature of the channel progress made by the test cases. It is not clear why the ten children in the control group failed, but the evidence points toward infection rather than to primary nutritive failure.

TABLE V. COMPARISON OF THE CHANGES IN PHYSICAL STATUS OF FORTY-SEVEN TEST CHILDREN AND FORTY-SEVEN CONTROL CHILDREN DURING A TWO-YEAR PERIOD

PHYSICAL STATUS			TEST CASES			CONTROL CASES		
BODY BUILD*	DEVELOPMENTAL LEVEL†	NUTRITIONAL GRADE‡	BOYS	GIRLS	TOTAL	BOYS	GIRLS	TOTAL
→	−	↘	11	15	26	5	5	10
→	+	↘	2	0	2	2	0	2
↔	+	↑	3	5	8	4	5	9
↔	0	↑	0	0	0	1	0	1
↔	−	↑	3	3	6	5	9	14
←	+	↖	1	3	4	3	5	8
←	−	↖	0	1	1	0	3	3

*→ Moved toward *B* side of Grid during study.
↔ Was in same channel at end of study as at beginning.
← Moved toward *A* side of Grid during study.
†− Gained less than one level per month.
0 Gained one level per month.
\+ Gained more than one level per month.
‡↘ Undernutrition, indicated by a slope less than the channel system.
↑ Optimal nutrition, indicated by an up-channel advance.
↖ Overnutrition, indicated by a slope greater than the channel system.

The character of the physical progress as ascertained by the child's own age schedule of development is compared for the two groups of children in Figs. 2, *A*, *B*, and *C*. The peak of the distribution of age schedules of development for the children in the control group appeared in the 15 to 67 per cent auxodrome, while that of the children in the test group appeared in the 67 to 82 per cent auxodrome. On the basis of sex, the peak of distribution for each group appeared as follows: boys in the control group, 2 to 67 per cent auxodrome; boys in the test group, 15 to 67 per cent auxodrome; girls in the control group,

A few odd facts about the family histories of these cretin children might be mentioned. In the case of a baby (B68987) after cretinism was recognized the serum iodines of both the mother and father were measured. The serum precipitable iodines of both the mother and father were normal, 6.7 and 6.3 gamma per cent, respectively. In the case of another baby (B75063) it was learned that the mother was pregnant. During this subsequent pregnancy her precipitable iodine conformed entirely with values for normal pregnant females 9.1 gamma per cent.[5] The baby born at the end of this pregnancy and another sibling have no clinical signs of diminished thyroid function. On the other hand, the mother of one of the cretin boys (B21080) had taken desiccated thyroid during her pregnancy. This fact has little significance. Occasionally pregnant women are given some thyroid. In another research project it was learned that two women, who were studied while taking 3 grains of thyroid daily during pregnancy, have had babies who are developing normally.

It has been found in regulating thyroid dosage for hypothyroid adults that patients are both subjectively and objectively better when their serum precipitable iodines are within the normal range.[15] It was noted that the child with the best clinical response to desiccated thyroid had a precipitable iodine above 4.0 gamma per cent and that the two children with the poorest clinical responses to thyroid had iodines of 1.6 and 2.4 gamma per cent. These facts prompt the question whether control of thyroid dosage in children might be facilitated by noting whether the serum precipitable iodine has risen to the normal range.

Another query concerning thyroid dosage is illustrated in Chart 3. The first baby, who was only 3 months old, has responded satisfactorily to ¾ grain of thyroid daily. The next three children, all of whom were older, 5, 13, and 30 months respectively, were given less thyroid, only ½ grain daily. It seems possible that cretin children would be benefited by slightly larger doses of thyroid than were used, or that the dose be increased as the baby grows older. In this connection, it might be pointed out that ¾ grain daily has not seemed clinically adequate for the 6½-year-old patient, the next to the last subject on the chart. When the last child, a boy of 7 years, was on one grain of thyroid a day, thyroid overdosage was suspected because of increased irritability; the dose was diminished slightly (to ¾ grain per day). The marked increase in his iodine may be exaggerated because a total, not a precipitable iodine was determined. The rise may also be more pronounced because only one month had elapsed after initiation of one grain of thyroid daily.

Further investigation should answer two questions. Is the measurement of serum precipitable iodine an aid in the diagnosis of thyroid hypofunction before clinical cretinism can be recognized? Does a more complete clinical response occur when thyroid dosage is regulated to maintain a normal serum iodine, than when thyroid dosage is insufficient to elevate the serum iodine to 4.0 gamma per cent? It is to be recognized that while there may be a good response in physical development to medication, mental development may lag behind. This

TABLE VII. COMPARISON OF SIMULTANEOUS CHANNEL-AUXODROME CHANGES IN FORTY-SEVEN TEST CHILDREN AND FORTY-SEVEN CONTROL CHILDREN IN A TWO-YEAR PERIOD

SIMULTANEOUS CHANNEL-AUXODROME CHANGES	TEST GROUP			CONTROL GROUP		
	BOYS	GIRLS	TOTAL	BOYS	GIRLS	TOTAL
Improved	0	1	1	3	2	5
Unchanged	14	14	28	12	19	31
Impaired	6	12	18	5	6	11

during the period of observation, their channel changes were such that they oscillated fairly rhythmically within a limited channel range, a factor which tended to obscure the results when measured in this manner.

DISCUSSION

In the use of height-weight determinations as indicators of growth progress of children, the tendency has been to compare the values obtained for the individuals with the mean or mode of a group heterogeneous in physique. This method of measurement obscured the principle that the interplay of genetic and environmental forces individualizes rather than generalizes. The Wetzel Grid technique, in which each child is his own standard of comparison, offers a method whereby height-weight determinations may be analyzed on an individual basis. The result is that variations of environmental origin which affect the growth process can be interpreted with a greater degree of individual accuracy. Therefore, to understand the effects of nutritive failure on growth, the patients used in this study were selected with the purpose of reducing the number of diverse genetic and environmental influences to a minimum. Genetically, both groups had a common background in that they were of native American stock whose families had lived in this region for generations. From the environmental standpoint, the groups were similar in that they were both free from acute infectious disease at the time of their selection. They differed sharply, however, in their socioeconomic background, dietary intake, and history or incidence of nutritional deficiency diseases.

The Wetzel Grid findings over a two-year period revealed that there was no significant difference in the channel course of the two groups of children. This was contrary to expectations. By contrast, the two groups, as groups, showed a distinct difference in their respective schedules of development, the children in the test group being on slower schedules of development than those in the control group. In the two-year period, the children in the test group underwent further retardation in their schedules of development. The extension of the retardation over the two-year period occurred despite their slower schedules of development. Slower schedules result in lower levels of development; this in turn suggests, concomitantly, reduced caloric needs. However, the retardation can be explained only by some inadequacy, since the children lost further ground. The dietary inadequacies seem to be the most logical explanation, since the incidence of illness was not increased in the test group.

A point of distinction between the two groups was the difference in the regularity of growth. The children in the test group, despite their slower

THE DETERMINATION OF STATUS AND PROGRESS IN CHILDREN WITH NUTRITIVE FAILURE

ARVIN W. MANN, D.D.S., SAMUEL DREIZEN, D.D.S., AND TOM D. SPIES, M.D.
BIRMINGHAM, ALA.
WITH THE TECHNICAL ASSISTANCE OF S. IDELL PYLE, M.S.
CLEVELAND, OHIO

THE effect of nutritive failure* on growth† has been studied intensively at the Nutrition Clinic of the Hillman Hospital, Birmingham, Ala., since 1936. This study was prompted by the observation that many of the children accompanying parents to the clinic showed the same signs and symptoms of nutritional deficiency disease as those observed in their parents.[2] An analysis of the kind and amount of food that the family ate revealed that few if any of the children could be getting the amounts of nutriment essential for normal growth.[3] This was substantiated by clinical observations which found the children to be thin, apathetic, and small for their age. The frequent presence of the classic signs of nutritional deficiency disease in the family pets,[4, 5] which lived on scraps from the family table, provided further proof of the inadequacy of the food available for these children. The foregoing observations, together with the evidence obtained from economic histories which revealed the impoverished state of these family groups, were taken as an indication that the failure to grow in this group of children was mainly nutritional in origin.

To determine the extent to which the growth and the physical condition of these children was influenced by nutritive failure, it was decided to compare them with a group of children free from nutritional deficiency diseases. This paper has been confined to a comparison of the findings obtained when the Wetzel Grid‡ for assessing physical fitness was used in conjunction with regular medical and dietary examinations over a two-year period of time.[6]

University of Cincinnati Studies in Nutrition at the Hillman Hospital, Birmingham, Ala. From the Department of Internal Medicine, University of Cincinnati.

These studies were supported by grants from the American Dry Milk Institute, Inc.

*"The term 'nutritive failure' perhaps means different things to different physicians. It is used in our clinic to describe a variable clinical picture and does not have a specific physiological connotation. It does not indicate why the nutrition has failed but simply that it has failed.

"Our work has convinced us that many times the physician cannot determine at once the [illegible] of the nutritional insufficiency, and by the use of this term he can . . . nical picture without knowing the precise causation. The term has . . . ntrenched in our clinical usage that it does not seem wise for us to . . . it.

"For the sake of clarity, the various disturbances and mechanisms which create a picture of nutritive failure we often describe separately. We can see pellagrous dermatitis or glossitis, beriberi neuritis or beriberi heart disease, scorbutic hemorrhages or gingivitis, cheilosis or the ocular symptoms of riboflavin deficiency as present symptoms arising as a response of the body to a long-continued deprivation of certain nutrients in food. Hence, nutritive failure is a more inclusive term than pellagra, beriberi, scurvy, or riboflavin deficiency in that it connotes varying degrees of mixed deficiencies operating simultaneously."[1]

†*Growth* is the progressive development of an organism from its earliest stages, characterized by increase in size and cell complexity.

‡The Wetzel Grid is but one of several methods which have been and are being used in the Nutrition Clinic to measure the effect of prolonged nutritive failure on the growth of children. Serial roentgenograms of the hand and forearm, photographs in the nude, and cephalometric x-rays are also being utilized, and these results will be reported separately in subsequent communications.

FURTHER OBSERVATIONS ON POST-TRACHEOTOMY, MEDIASTINAL EMPHYSEMA, AND PNEUMOTHORAX

GILBERT B. FORBES, M.D., ST. LOUIS, MO., GEORGE SALMON, M.D., HOUSTON, TEXAS, AND JOHN C. HERWEG, M.D., ST. LOUIS, MO.

THE occurrence of two fatalities from the hitherto unexpected post-tracheotomy complications of mediastinal emphysema and pneumothorax at the St. Louis Children's Hospital several years ago[1] prompted a study in regard to the incidence and etiology of these phenomena. For this purpose we have closely observed the postoperative course of all tracheotomized patients at both the St. Louis Children's and St. Louis City Hospitals during the period from December, 1941, through May, 1946. In addition, we have endeavored to correlate such factors as the patient's age, the disease for which the tracheotomy was done, the degree of dyspnea present at the time of operation, and the procedure of preoperative bronchoscopy with the incidence of these complications.

At the time our first cases were recognized, we postulated, as have others,[2-4] that mediastinal emphysema resulted from the factor of forced inspiration in the face of an inadequate airway and an open neck wound (the tracheotomy), pneumothorax, in turn, being due to rupture of the mediastinal pleura through overdistension of the mediastinum with air. Preoperative bronchoscopy was suggested as a means of obviating these complications, and, in conference with the Department of Otolaryngology, it was decided to employ this procedure more or less routinely in future patients with a view toward determining its value. In order to test the postulate that air can make its way into the mediastinum from the cervical region, certain animal experiments were designed in which an attempt was made to produce mediastinal emphysema under conditions simulating those present in the human patient whose airway is partially obstructed at the time of tracheotomy.

Our clinical and experimental observations will be described separately.

CLINICAL OBSERVATIONS

The cases reported here consist of ninety-nine tracheotomies done on ninety-six patients at the St. Louis Children's Hospital and twenty-one tracheotomies at the St. Louis City Hospital. Three patients are included who were previously reported.[1] Of the 120 operations in this series, seventy-six were performed by thirteen different otolaryngologists who were on either the visiting or full-time staffs of the two hospitals, thirty-six by the resident house officers in otolaryngology, and eight by the general surgeons. Of the patients, 68 per cent were 2 years of age or under, 22 per cent between 2 and 5 years, and 10 per cent between 5 and 10 years. The majority of the operations were done to relieve

From the Department of Pediatrics, Washington University School of Medicine, and the St. Louis Children's and City Hospitals.

TABLE I. MEDICAL REPORT OF FORTY-SEVEN TEST CHILDREN AND FORTY-SEVEN CONTROL CHILDREN

ILLNESS OR SYMPTOM	TEST CASES			CONTROL CASES		
	BOYS	GIRLS	TOTAL	BOYS	GIRLS	TOTAL
Signs and Symptoms Suggestive of Nutritional Deficiency						
Sense organs:						
Ocular injection	13	20	33	0	0	0
Photophobia	7	9	16	1	0	1
Night blindness	5	7	12	0	0	0
Burning and itching of eyes	10	10	20	0	0	0
Digestive system:						
Slick tongue (atrophied lingual papillae)	6	6	12	0	0	0
Hypertrophied lingual papillae	8	9	17	0	0	0
Glossodynia	0	4	4	0	0	0
Engorged swollen hypertrophied gingivae	7	3	10	0	0	0
Bilateral cheilosis	9	10	19	0	0	0
Riboflavin glossitis	8	10	18	1	0	1
Anorexia	8	12	20	0	0	0
Diarrhea	3	3	6	0	0	0
Neuromuscular system:						
Calf tenderness	1	5	6	0	0	0
Pseudohallucinations	3	7	10	0	0	0
Burning sensation of extremities	3	3	6	0	0	0
Irritability, fear, apprehension	3	8	11	0	0	0
Skeletal system:						
Rachitic rosary	0	1	1	0	0	0
Epithelial system:						
Hyperkeratosis of hair follicles	3	4	7	0	0	0
Skin furuncles	5	12	17	0	0	0
General appearance:						
Emaciation	2	3	5	0	0	0
Total	104	146	250	2	0	2
Acute Infectious Diseases						
Rubeola	0	0	0	3	0	3
Endemic parotitis	0	1	1	2	0	2
Tonsillitis	3	1	4	1	0	1
Pneumonia	0	0	0	1	1	2
Septic sore throat	0	0	0	0	2	2
Appendicitis	0	1	1	1	0	1
Varicella	0	3	3	1	0	1
Influenza	0	1	1	3	4	7
Scarlatina	0	0	0	0	1	1
Acute otitis	0	2	2	1	2	3
Total	3	9	12	13	10	23
Miscellaneous Diseases						
Food allergies	0	4	4	3	0	3
Asthma	0	1	1	1	1	2
Hay fever	0	1	1	0	0	0
Total	0	6	6	4	1	5

spect to their nutritional value (Table II). While only two of the children in the test group were on diets which were regarded as adequate in all respects, forty-one of the forty-seven children in the control group had diets which met all the requirements of adequacy at the time they were evaluated.

TABLE II. RELATIVE FREQUENCIES OF MEDIASTINAL EMPHYSEMA AND PNEUMOTHORAX IN RELATION TO PREOPERATIVE BRONCHOSCOPY

HOSPITAL	PREOPERATIVE BRONCHOSCOPY	NO. CASES	NO. CHECKED FOR ME	NO. ME	NO. CHECKED FOR PT	NO. PT
St. Louis Children's	Bronchoscoped preoperatively	41	23	6	27	0
	Not bronchoscoped	58	32	15	35	7
St. Louis City	Bronchoscoped preoperatively	10	9	3	10	1
	Not bronchoscoped	11	10	6	10	4
Totals	Bronchoscoped preoperatively	51	32	9	37	1
	Not bronchoscoped	69	42	21	45	11

TABLE III. AGE DISTRIBUTION OF PATIENTS

AGE (YR.)	NO. CASES	NO. BRONCHOSCOPED	NO. CHECKED FOR ME	NO. ME	NO. CHECKED FOR PT	NO. PT
0–1	34	16	20	7	22	3
1–2	48	24	33	14	38	6
2–5	26	10	14	8	15	2
5–10	12	1	7	1	7	1
Total	120	51	74	30	82	12

TABLE IV. DEGREE OF RESPIRATORY DISTRESS PRESENT AT TRACHEOTOMY

DEGREE RESPIRATORY DISTRESS	NO. CASES	NO. BRONCHOSCOPED	NO. CHECKED FOR ME	NO. ME	NO. CHECKED FOR PT	NO. PT
None	6	0	2	1*	2	0
Moderate	63	26	33	9	37	2
Marked	38	19	29	15	32	7
Extreme (Emergency)	13	6	10	5	11	3

*Marked struggling.

procedure was considered advisable but not carried out because of either undue laryngeal edema or the emergency nature of the situation. Table II illustrates the relative frequencies of ME and PT in the two groups of patients, the incidence of ME being approximately 70 per cent greater for the nonbronchoscoped than for the bronchoscoped group, and the incidence of PT some eight times greater for the former group. These differences are statistically significant.*

In Table III our patients are arranged according to age. The number of patients who were bronchoscoped preoperatively is indicated for each age group in order to exclude the possibility of the comparative frequencies being distorted by that factor. Patients in the 5- to 10-year age group had the lowest incidence of ME and PT; the small number of patients in this group, however, does not allow a valid comparison.

In Table IV the patients are grouped with respect to the degree of respiratory distress present at the time of tracheotomy. Except for the group

*For the bronchoscoped and nonbronchoscoped patients, respectively, the frequencies of the occurrence of pneumothorax and the standard error of the ratios are 1.96 per cent ± 1.93 per cent, and 15.9 per cent ± 4.4 per cent. Similarly, for the occurrence of mediastinal emphysema, they are 17.7 per cent ± 5.26 per cent, and 30.4 per cent ± 5.57 per cent for the two groups of patients.

TABLE IV. CHANNEL READINGS IN FORTY-SEVEN TEST CHILDREN AND FORTY-SEVEN CONTROL CHILDREN AT BEGINNING AND END OF TWO-YEAR STUDY

CHANNEL READING		TEST GROUP			CONTROL GROUP		
START	END	BOYS	GIRLS	TOTAL	BOYS	GIRLS	TOTAL
Movement in Most Favorable Physique Channels (A_1 M B_1)							
M	A_1	1	0	1	1	1	2
B_1	M	0	0	0	1	2	3
A_1	A_1	1	0	1	2	2	4
B_1	B_1	2	3	5	1	6	7
M	M	2	0	2	4	4	8
A_1	M	2	3	5	3	0	3
A_1	B_1	1	2	3	1	0	1
M	B_1	7	4	11	0	0	0
Total		16	12	28	13	15	28
Movement Toward More Favorable Physique Channels (Toward A_1 M B_1)							
B_2	B_1	0	3	3	0	2	2
A_2	A_1	1	0	1	1	1	2
A_2	M	1	0	1	1	1	2
Total		2	3	5	2	4	6
Movement Toward Less Favorable Physique Channels (Toward A_2-A_4 B_2-B_4)							
A_1	A_2	0	0	0	0	1	1
A_1	A_2	0	0	0	1	1	2
M	B_2	0	1	1	0	0	0
B_1	B_2	0	4	4	0	1	1
Total		0	5	5	1	3	4
Movement in Least Favorable Physique Channels (A_2-A_4 B_2-B_4)							
A_3	A_4	0	0	0	0	1	1
B_3	B_2	0	1	1	0	0	0
A_2	A_2	0	0	0	2	0	2
B_2	B_2	1	2	3	1	2	3
B_3	B_3	0	2	2	1	0	1
B_4	B_4	0	1	1	0	0	0
A_3	A_2	1	0	1	0	0	0
B_2	B_3	0	1	1	0	2	2
Total		2	7	9	4	5	9

whether the cause of the physique differences was nutritional or genetic, it would seem that the nutritional influence could be responsible for the greater frequency of channel variation in the test group.

A summary of the physique channel changes occurring on the Wetzel Grid, when the children were grouped according to sex and experimental status, is shown in Table IV. These changes are recorded as the difference in the channel positions occupied by the children at the beginning and at the end of the study. Twenty-eight of the children in the test group moved about but remained in the most favorable physique channels (A_1 M B_1), nine remained in the least favorable channels (A_2-A_4 B_2-B_4), five shifted into more favorable channels, and five moved into less favorable channels during the two-year period. By contrast, twenty-eight children in the control group moved about but remained in the most favorable physique channels, nine remained in the least favorable physique channels, six shifted into more favorable channels, and four moved into less favorable channels during the same period of time. It would appear that while changes in channel position, when analyzed in this way, did not offer a point of significant distinction between the two groups of children, the direction of the movement

following a second tracheotomy two weeks later. The third patient suffered neither complication following two tracheotomies done two weeks apart.

In those patients who suffered embarrassment from ME and/or PT, it is possible to determine fairly accurately the elapsed time from the operation to the onset of these complications. This time varied from twenty minutes to twelve hours, with an average of 3.8 hours. The time required for ME to disappear varied from two to eleven days, with an average of 6.7 days. The "precordial crackle," a peculiar crackling sound synchronous with the heart beat, and first emphasized by Hamman[5] as an important diagnostic sign in ME, was heard in only six of our patients. This sign may have been present though not detected in some patients, due to the necessity of carrying out the examination of the chest in the supine position. Subcutaneous emphysema was noted in eleven of the patients who exhibited ME. Subcutaneous emphysema also occurred in several patients who were free from ME.

Not all of the patients with ME experienced symptoms from this condition. Of the nineteen patients with ME alone (see Table VI) twelve had no untoward symptoms clearly attributable to this complication, the condition being discovered either by roentgenographic or post-mortem examination. Two patients had moderate dyspnea requiring the administration of oxygen, and three patients had severe embarrassment, resulting in the death of two of them. In the remaining two patients it was impossible to determine what part, if any, the presence of ME played in their symptoms. One was an instance of hemolytic streptococcal laryngotracheobronchitis with membrane formation in the trachea; the patient was extremely toxemic and expired twelve hours postoperatively. The other patient had diphtheria complicated by myocarditis and extensive membrane formation throughout the greater part of the tracheobronchial tree.

TABLE VI. SYMPTOMS FROM MEDIASTINAL EMPHYSEMA

SYMPTOMS	NO. CASES
None	12
Moderate dyspnea	2
Severe embarrassment	3
Impossible to evaluate	2

Twelve patients had PT; in all but one of these ME was also present (Table VII). Pleural aspiration was carried out in three of the four patients who had moderate distress with cyanosis; relief was immediate, and in only one did the aspiration have to be repeated. The other patient in this group responded satisfactorily to oxygen therapy, the air disappearing from the pleural cavity over a period of seven days. This patient, in addition to the one who

TABLE VII. MEDIASTINAL EMPHYSEMA AND PNEUMOTHORAX

SYMPTOMS	NO. CASES	LOCATION	NO. CASES
None	1	Right	5
Mild	1	Left	2
Moderate	4	Bilateral	5*
Severe	6*		

*One patient did not have ME.

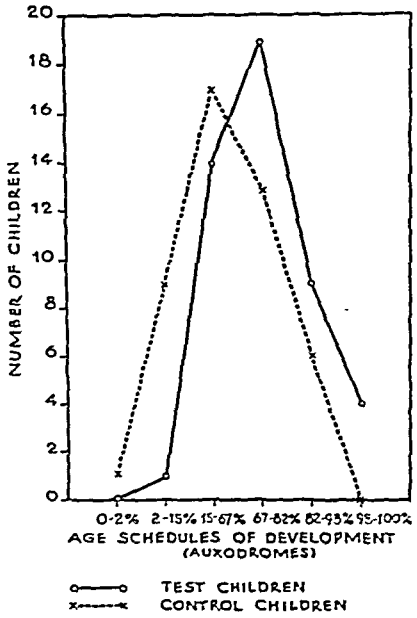


Fig. 2A.

Fig. 2A.—Graph showing the comparison of the age schedules of development (auxodromes) for children in the test and control groups. The children in the control *group had* for the most part faster schedules of development than did those in the test group.

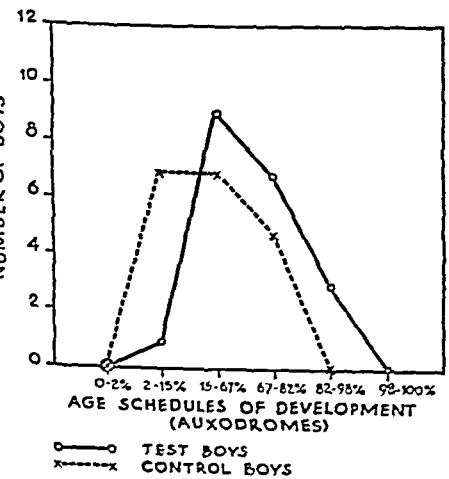


Fig. 2B.

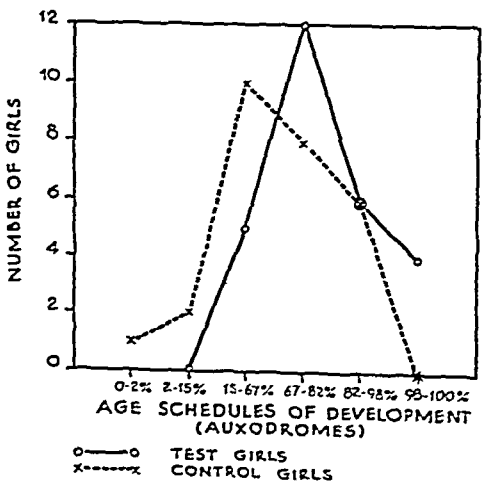


Fig. 2C.

Fig. 2B.—Graph showing that the boys in the control group had faster schedules of development than did those in the test group.

Fig. 2C.—Graph showing that the girls in the control group had faster schedules of development than did those in the test group.

exhibited only mild symptoms (increased respiratory rate), would not have been diagnosed had not routine roentgenographic examination been done.

Since ME and PT can occur in nontracheotomized patients suffering respiratory embarrassment and from causes unknown in otherwise healthy individuals, the question may be raised as to whether these complications could have been present prior to tracheotomy in some of the patients in our series. In sixteen of our thirty-one cases of ME and/or PT, preoperative fluoroscopy was done,



Fig. 1.—Case 5. Posterior-anterior roentgenogram showing mediastinal emphysema, left pneumothorax, and subcutaneous emphysema. Note that the film was reversed during the printing process.

and it is definitely known that these conditions were not present prior to tracheotomy. Of the remaining fifteen patients, seven had symptoms from ME and/or PT during their postoperative course following the initial relief due to the tracheotomy. There was one patient who developed ME following tracheotomy and yet had no respiratory distress whatsoever prior to the operation (Table IV).

The patients who exhibited notable symptoms from ME and PT are presented in more detail in Table VIII. The two hospitals are separated in the table, the patients at each being listed in chronological order. It should be noted that three patients suffered marked embarrassment from ME alone; two

15 to 67 per cent auxodrome; and girls in the test group, 67 to 82 per cent auxodrome. In general, the children in the test group had a slower age schedule of development than those in the control group. For the most part, the children in the test group were below, and the children in the control group were above the 67 percentile auxodrome, which Wetzel regards as the medical normal.

The changes in the age schedules of development are recorded in Table VI. Thirty-six of the children in the test group and twenty-three of those in the control group were retarded, as compared with eleven of the children in the test group and twenty-four of those in the control group who were unchanged or who improved their schedule of development during the two-year period.

TABLE VI. COMPARISON OF THE CHANGES IN AGE SCHEDULES OF DEVELOPMENT (AUXODROMES) IN FORTY-SEVEN TEST AND FORTY-SEVEN CONTROL CHILDREN IN A TWO-YEAR PERIOD

	AGE SCHEDULE OF DEVELOPMENT						TOTAL AUXODROME CHANGES		
	ABOVE 67 PER CENT AUXODROME			BELOW 67 PER CENT AUXODROME					
GROUP	ADVANCED	UNCHANGED	RETARDED	ADVANCED	UNCHANGED	RETARDED	ADVANCED	UNCHANGED	RETARDED
Test boys	1	2	8	2	2	5	3	4	13
Test girls	0	0	6	2	2	17	2	2	23
Total	1	2	14	4	4	22	5	6	36
Control boys	5	3	8	1	2	1	6	5	9
Control girls	4	6	6	1	2	8	5	8	14
Total	9	9	14	2	4	9	11	13	23

When divided on the basis of their previous schedules of development, eighteen children in the control group who were above the 67 per cent auxodrome either picked up speed or remained unchanged in their schedule, while fourteen slowed down. Six of the fifteen controls who were on a schedule below the 67 per cent auxodrome advanced or remained unchanged in their growth progress, while nine slowed down. Case records indicated that infection played a large part in the retardation observed in this group of children.

By contrast, three children in the test group who were above the 67 per cent auxodrome advanced or remained unchanged in age schedule of development, while fourteen were retarded. Eight of the thirty children in the test group who were on a schedule below the 67 per cent auxodrome advanced or remained unchanged, while twenty-two slowed down. It would appear that in this group malnutrition was concurrent with the decrease in their schedules of development.

The findings reported in Table VII show the number of children who had simultaneous losses in both channel and schedule of development on the Grid throughout the two-year period, a criterion suggestive of nutritional interference with growth.[8, 9] Eleven of the children in the control group and eighteen in the test group underwent auxodromic slowing down together with an undesirable change in the physique channel. Again, infectious disease appeared to have played a major role in the changes observed in the children in the control group. While many of the children in the test group were decelerated

of air were removed, the intrapleural pressure was sufficiently reduced to ameliorate symptoms.

CASE 10.—This 18-month old white female was admitted to the St. Louis City Hospital Jan. 12, 1943, suffering from laryngotracheobronchitis. Tracheotomy produced considerable relief. The patient did fairly well until twelve hours postoperatively when the tracheotomy tube became slightly misplaced and filled with mucus. She suffered extreme distress at this time and was revived with considerable difficulty. Bronchoscopic examination revealed the tracheobronchial tree to be free of obstruction. Despite repeated tracheal suction and oxygen therapy, she continued to have repeated episodes of dyspnea and cyanosis. Respirations gradually became more shallow; cyanosis increased, and she expired about an hour after the original episode. Fig. 2 is a roentgenogram taken shortly after death, showing massive ME. Subcutaneous emphysema and PT were not present. Autopsy disclosed an extensive ME which was estimated to fill approximately one half of the thoracic cage. In addition, there was considerable retroperitoneal emphysema extending down to the common iliac vessels.



A. *B.*

FIG. 3.—*A*, posterior-anterior, and *B*, lateral roentgenograms of the chest (Case 12).

CASE 12.—This 3-year old white male was admitted to the St. Louis City Hospital on Oct. 24, 1944, with acute laryngitis. There was marked retraction on inspiration. Tracheotomy was done with difficulty because of much struggling. He was relieved by this procedure. Thirty minutes postoperatively fluoroscopy revealed questionable ME. During the next few hours he had two or three attacks of moderate dyspnea and cyanosis, relieved in each case by suctioning mucus from the tracheotomy tube. Eight hours postoperatively he suddenly expired. Examination of the chest revealed signs of bilateral pneumothorax, and roentgenograms were made (Fig. 3.*A* and *B*) which show extensive ME and bilateral PT. Subcutaneous emphysema was also present. These findings were confirmed at autopsy, at which time pleural aspirations demonstrated the pneumothorax to be of the tension variety.

schedules of development, had a marked tortuous mode of up-channel progress. Wetzel has proposed that simultaneous losses in channel and schedule are Grid criteria suggestive of nutritional interference with growth and development as he defines them.[6] The difference in the number of children in the test group (eighteen) and the number of children in the control group (eleven) who experienced these simultaneous changes throughout the two-year period was not as dramatic as might have been expected. The differences may be accounted for on the basis of infection and the interrelation between schedule of development and caloric needs. The comparatively lower metabolic needs of the children in the test group were dependent on their slower schedule of development rather than on their physical condition. This permitted them to maintain their physique channel positions more readily than children on fast schedules who reach higher developmental levels.

SUMMARY AND CONCLUSIONS

1. Medical, dietary, and Wetzel Grid findings in children without symptoms of nutritional deficiency diseases on a fairly adequate diet and children with signs and symptoms suggestive of nutritive failure were compared for a two-year period. No therapy was given during the two years.

2. The analysis of physical status by the Wetzel technique paralleled the medical and dietary observations; in general, nutritive failure in children resulted in instability of up-channel progress on the Grid. The analysis of physical progress by the Grid technique raised some equivocal questions.

3. The auxodrome as a tool proved to be a good screening device in the Nutrition Clinic for separating children into groups according to their schedules of development and regularity of progress.

4. The findings in this study revealed to us the desirability of supplementing the auxodrome with other devices, such as the x-ray findings, for the measurement of rate of growth. X-rays are necessary aids in the differentiation between children who are often grouped into a single category for two reasons; i.e., they were small either because of their genetic inheritance or small because of inadequate nutrition.

We wish to acknowledge our indebtedness to Dr. Norman Glass and the late Dr. Charles Bray, Medical Department, American Cast Iron Pipe Company, Birmingham, Ala., for their cooperation in providing us with a source of control patients.

REFERENCES

1. Spies, T. D.: M. Clin. North America, New York Number, p. 794, 1945.
2. Spies, T. D.: Transactions and Studies of the College of Physicians of Philadelphia 8: 12, 1940.
3. Spies, T. D., Ewing, G. D., and Mann, A. W.: Arch. Pediat. 61: 517, 1944.
4. Heath, M. K., MacQueen, J. W., and Spies, T. D.: Science 92: 514, 1940.
5. Spies, T. D.: Science 98: 369, 1943.
6. Wetzel, Norman C.: J. A. M. A. 112: 1187, 1941.
7. Wetzel, Norman C.: J. PEDIAT. 22: 82, 1943.
8. Wetzel, Norman C.: J. PEDIAT. 22: 208, 1943.
9. Wetzel, Norman C.: J. PEDIAT. 22: 329, 1943.

with air after each tap, closed siphon drainage of each pleural cavity, using an 18-gauge needle, was instituted. Air bubbled out continuously through each needle, but the patient rapidly lost ground and expired seven hours postoperatively. Autopsy confirmed the presence of massive ME and bilateral PT.

CASE 6.—This 2-year-old white male was admitted to the St. Louis Children's Hospital on Nov. 3, 1944, with a diagnosis of tracheal foreign body. He had had episodes of coughing and fever during the previous three months. Physical and roentgenographic examination of the chest revealed evidence of chronic bronchitis; ME was not present. Bronchoscopy was unsuccessful in removing the foreign body, which lodged in the larynx, necessitating an emergency tracheotomy. Repeated low bronchoscopies failed to locate the foreign body. Two hours following tracheotomy the child's condition became much worse, retractions were marked, and he was moderately cyanotic. Fluoroscopy at this time revealed ME and bilateral PT. Pleural aspiration yielded 270 c.c. of air from the right side and 170 c.c. from the left under pressure. Immediate relief resulted from this procedure. The following day subcutaneous emphysema developed, and the child seemed very restless, exhibiting an increased respiratory rate but no retraction. A chest roentgenogram at that time (Fig. 4) showed right PT. Five hundred cubic centimeters of air were withdrawn with improvement. Bronchoscopy was done later that day and the foreign body recovered from the right main bronchus. The patient's further course was uneventful, air disappearing from the mediastinum within seven days.

CASE 7.—A 23-month-old white male was admitted to the St. Louis Children's Hospital on Feb. 10, 1946, with the diagnosis of laryngotracheobronchitis and salicylate intoxication. Tracheotomy afforded relief from the respiratory obstruction, yet his general condition remained poor, and hyperpnea continued because of the salicylism. A small amount of ME was noted thirty minutes after the operation; within an additional fifteen minutes ME had become very pronounced, and subcutaneous emphysema developed. The pulse was very rapid and thready, the respirations rapid and shallow; intense cyanosis developed, and the baby appeared to be in extremis. The precordium was resonant to percussion, and a faint precordial crackle was audible. Pneumothorax was not present, nor was it noted subsequently. Stimulants, oxygen, and repeated suctioning of the tracheotomy tube failed to produce improvement. His condition remained critical for the next three and one-half hours, during which time the pulse remained above 120 though it varied in volume; blood pressure readings were 130/80 and 115/75 on two occasions. During this period repeated aspirations of the mediastinum were done, a total of 400 c.c. of air being withdrawn from the left side (of the sternum) and 10 c.c. from the right. Although the first aspiration produced considerable relief, subsequent ones did not seem to help him greatly; however, they were done whenever the amount of air in the mediastinum seemed to be increasing as determined by fluoroscopy. Packing the tracheotomy wound tightly with merthiolate gauze did not prevent the reaccumulation of air within the mediastinum, and it was not until a larger tracheotomy tube was inserted that the ingress of air ceased. Air exchange in both lungs seemed good at all times except for one occasion when the breath sounds became depressed at the left lower lung field; they quickly returned to normal following the removal of some air from the mediastinum. During the next twelve hours, three additional mediastinal aspirations were done with recovery of a total of 25 c.c. of air. He continued to exhibit periods of moderate respiratory distress during the next three days; mediastinal and subcutaneous emphysema gradually diminished, however, and his subsequent hospital course was uneventful.

These three cases illustrate treatment. Our experiences with Case 7 suggest that the treatment of Case 13 might have been successful had aspiration of the mediastinum been done. In the latter case it is evident that the closed intercostal siphon drainage system was inadequate, and it might have been better

acute respiratory distress of varying degree. All patients were carefully observed throughout the postoperative period for symptoms and signs of mediastinal emphysema and pneumothorax. Frequent physical examinations of the chest were made, and whenever possible daily fluoroscopic or radiological examinations were carried out, the latter in both the posterior-anterior and lateral views.

Of the ninety-nine operated patients observed at the St. Louis Children's Hospital, it was possible to check fifty-five by means of lateral roentgenographic examination for the presence or absence of mediastinal emphysema, and at the St. Louis City Hospital nineteen of the twenty-one patients were similarly checked. Although we cannot be certain that the remaining patients did not have mediastinal emphysema of mild degree, they exhibited no symptoms or physical signs of that disorder. Sixty-two patients at Children's Hospital and twenty at the City Hospital were checked roentgenographically for the presence or absence of pneumothorax. The remaining patients did not have clinically detectable pneumothorax. Because we were unable to determine unequivocally the presence or absence of these complications in all of our patients, we have calculated our frequency data on the basis of both the total patients in the series and the number accurately checked.

Table I gives data on the incidence of mediastinal emphysema (ME)* and pneumothorax (PT)* in our series of patients. The frequency with which ME occurred is rather striking and is much greater than we had anticipated at the beginning of the study. If we consider the entire group of patients, ME was observed in 25 per cent, but if we take only those patients who were carefully checked for this complication, the incidence becomes 41 per cent. Pneumothorax occurred in 10 per cent of the patients, considering the group as a whole, and in 15 per cent of patients who were checked roentgenographically.

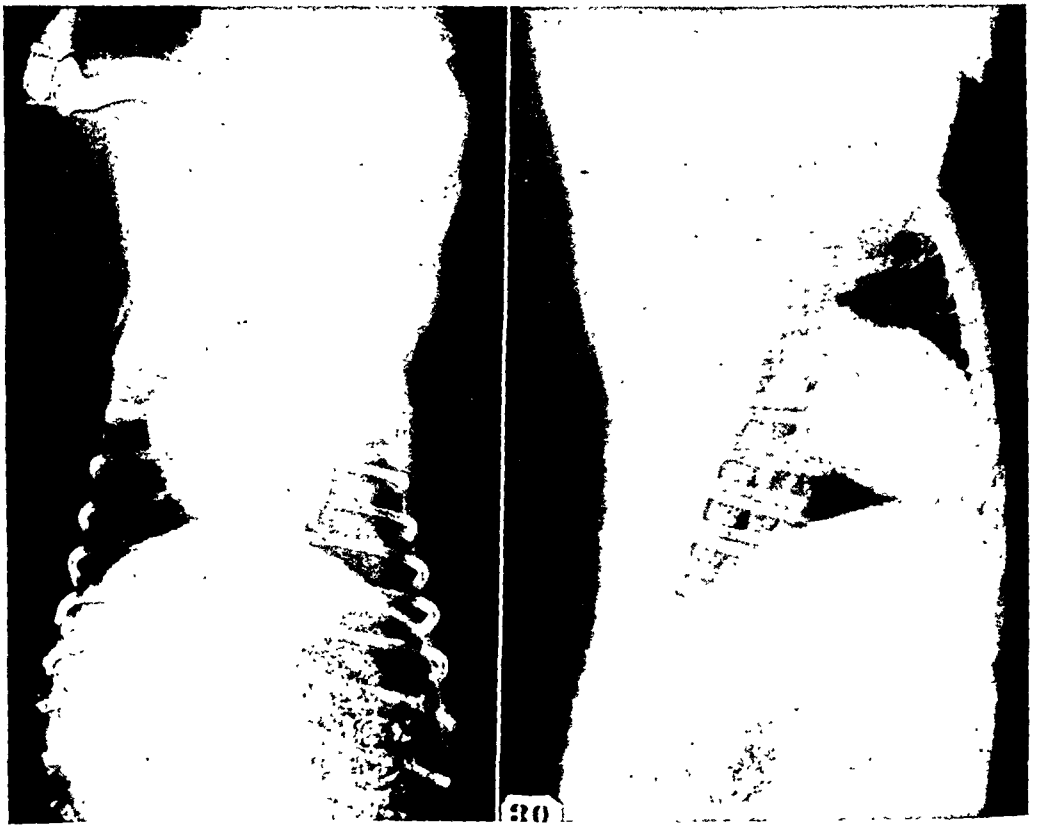
TABLE I. INCIDENCE OF MEDIASTINAL EMPHYSEMA AND PNEUMOTHORAX

HOSPITAL	NO. CASES	NO. CHECKED FOR ME	NO. ME	NO. CHECKED FOR PT	NO. PT
St. Louis Children's	99	55	21	62	7
St. Louis City	21	19	9	20	5
Totals	120	74	30	82	12

Since not all patients in this series were bronchoscoped prior to tracheotomy, it is of interest to note what effect an indwelling bronchoscope at the time of operation had on the incidence of postoperative ME and PT. It was postulated at the beginning of this study[1] that the provision of an adequate airway (by means of an indwelling bronchoscope, or intubation tube) during the tracheotomy procedure would minimize the likelihood of ME and PT. The natural differences of opinion among the hospital staff in regard to the advisability of this procedure provided us with a sufficient number of patients for "controls" to allow a fairly accurate evaluation of the worth of this procedure. In several of the sixty-nine patients who were not bronchoscoped preoperatively, the

*These abbreviations will be used freely throughout the remainder of the text.

Experiment V. Local anesthesia only: 30 c.c. of a 0.5 per cent solution of trypan blue placed in tracheotomy wound. Moderate dyspnea maintained for one hour. Roentgenograms (Fig. 5, *A* and *B*) show ME and left PT. At autopsy, air was seen to fill the superior mediastinum, and there were bubbles of air about the great vessels and along the aorta as far down as the diaphragm (Fig. 5, *C*). Trypan blue extended into mediastinum down to tracheal bifurcation. Injection of mediastinum with methylene blue solution revealed a small rupture in the left superior-posterior mediastinum. The lungs were grossly normal; no tear in visceral pleura could be detected by injection of tracheobronchial tree with methylene blue.



A. *B.*

Fig. 5*A*, *B*, *C*.—Experiment V. *A*, anterior-posterior and *B*, lateral roentgenograms, showing mediastinal emphysema and left pneumothorax.

Experiment VI. Conditions of Experiment V were repeated. Dyspnea was maintained for one hour. A moderate amount of air and trypan blue was found in the superior mediastinum at autopsy. PT was not present.

Experiment VII. 30 c.c. of lipiodol were placed in the tracheotomy wound. Moderate dyspnea was maintained for thirty minutes, during which time the lipiodol could be seen to disappear gradually. A roentgenogram taken at this time is illustrated in Fig. 6. Dyspnea was maintained for an additional two and one-half hours, whereupon lipiodol and air continued to collect in the mediastinum (Fig. 7, *A* and *B*). Autopsy confirmed the presence of

labeled "none" the percentage of preoperative bronchoscopies was about the same in each group. The incidence of ME rises from an average of approximately 15 per cent in the patients who had little or no respiratory distress to 40 per cent in those with more marked degrees of embarrassment. Similarly, the frequency of PT becomes greater with increasing respiratory distress to the point where, in the group of "emergency" cases, it occurred in 23 per cent of the patients.

Table V lists the diseases present in our patients requiring tracheotomy. The category labeled "other upper respiratory obstruction" includes such occurrences as laryngeal or tracheal foreign body, laryngeal edema (other than that resulting from bronchoscopy), granulation tissue in the trachea, and papillomas of the larynx. In the "elective" group is one patient in whom tracheotomy was done in order to administer a general anesthetic for an intraoral operation and five in whom it was done prior to a diagnostic bronchoscopy; none had respiratory distress. Of the first five groups, which are the only ones containing enough cases for accurate comparison, the cases of laryngotracheobronchitis have the highest incidence of ME. Pneumothorax occurred with greatest frequency in groups I, IV, and V; the differences in frequency for the various groups is much less striking, however, than those for ME.

TABLE V. DISEASES PRESENT IN PATIENTS REQUIRING TRACHEOTOMY

GROUP	DISEASE	NO. CASES	NO. BRONCHO-SCOPED	NO. CHECKED FOR ME	NO. ME	NO. CHECKED FOR PT	NO. PT
I	Laryngotracheobronchitis	26	12	19	11	20	4
II	Acute laryngitis, diphtheria	28	14	20	6	22	2
III	Postbronchoscopy	23	9	11	3	13	1
IV	Acute bronchiolitis	14	8	8	3	9	2
V	Other upper respiratory obstruction	14	5	8	3	8	2
VI	Intraoral obstruction	6	2	4	3	6	1
VII	Dyspnea from pulmonary disease	3	0	2	0	2	0
VIII	Elective	6	1	2	1*	2	0
	Totals	120	51	74	30	82	12

*Marked struggling.

Of the 120 operated patients, thirty-one suffered one or both of these complications. In compiling this total, we excluded one patient who developed ME after having had a tracheotomy tube in place for twenty-seven days and who at autopsy was found to have an extensive ulceration of the trachea. Mediastinal emphysema without accompanying PT occurred in nineteen patients; eleven had both ME and PT, and one had PT alone. Three of the patients in this series were subjected to two separate tracheotomies. One, who developed ME and left PT following a tracheotomy at 2 months of age, *failed* to develop either complication when the procedure was repeated under identical conditions one year later. Another patient 14 months of age, developed ME and left PT following tracheotomy, only to have ME and right PT recur

DISCUSSION

A number of instances of mediastinal emphysema and pneumothorax, occurring both in association with tracheotomy and spontaneously, have now been reported, and an analysis of these phenomena has been presented in two excellent reviews.[3, 7] It is evident from a study of our data that both ME and PT are seen with considerable frequency in tracheotomized patients, the



Fig. 6.—Experiment VII. Lateral roentgenogram taken after thirty minutes of dyspnea, showing lipiodol in superior and posterior mediastinum.

percentages being 25 and 10 respectively in our series.* The contention that experience of our clinic in this regard might be unique is disproved by two other reported series of tracheotomized patients. Neffson,[3] reviewing 126 cases of nondiphtheritic obstruction of the larynx, trachea, and bronchi from the Willard Parker Hospital, found seventeen instances of PT and thirty of ME, which compares favorably with our experience. He ascribes death due to tension PT in five cases; in two of these ME was not present. In one case PT (without ME)

*When only those patients who were accurately checked are considered, ME occurred in 41 per cent and PT in 15 per cent of our patients

TABLE VIII.

PATIENT	YR.	AGE	DISEASE	ELAPSED TIME	SYMPTOMS	ME	PT	TREATMENT	DISAPPEARANCE OF AIR	OUTCOME
Children's Hospital										
(1) D. A.	'41	14 mo.	postbronchoscopy	20 min.	gasping respirations sudden death	0	bilat.	recognized at death		D
(2) E. A.	'42	12 mo.	F.B.* trachea	4 hr.	Cheyne-Stokes, retraction, circulatory collapse	++++	0	aspiration mediastinum failed		D
(3) L. A.	'42	2 mo.	hemangioma soft palate	20 min.	dyspnea, cyanosis	++	right	aspiration pleura twice	3 days	R†
(4) T. B.	'42	14 mo.	L-T-B‡	6 hr.	dyspnea, retraction, mediastinal shift	++	left	aspiration pleura once	3 days	R
(5) G. B.	'43	14 mo.	acute laryngitis	7 hr.	dyspnea, mediastinal shift	+	left	aspiration pleura once	8 days	R§
(6) S. W.	'45	2 yr.	F.B.* trachea	2 hr.	retraction, cyanosis, marked distress	+	bilat.	aspiration right pleura twice, left once	7 days	R
(7) R. B.	'46	23 mo.	L-T-B	45 min.	cyanosis, dyspnea	++++	0	repeated aspiration mediastinum	9 days	R
City Hospital										
(8) L. M.	'42	2 mo.	bronchiolitis	2 hr.	repeated attacks cyanosis, dyspnea, death in 8 hr.	+	right	undiagnosed		D
(9) W. W.	'42	4 mo.	bronchiolitis	6 hr.	repeated attacks dyspnea, retraction, sudden death in 6 hr.	+++	right	undiagnosed		D
(10) G. L.	'43	18 mo.	acute laryngitis	12 hr.	faulty tube, then hypopnea, cyanosis, gasps	++++	0	undiagnosed		D‖
(11) L. E.	'44	7 yr.	L-T-B	30 min.	shallow rapid respirations	+	bilat.	oxygen	7 days	R
(12) R. I.	'44	3½ yr.	acute laryngitis	8 hr.	sudden death	++++	bilat.	none		D
(13) P. B.	'45	14 mo.	L-T-B	2 hr.	retraction, cyanosis, dyspnea, marked distress	+++	bilat.	continuous siphon suction both pleurae, unsuccessful		D

*Foreign body.
†Tracheotomy one year later without complication.
‡Laryngotracheobronchitis.
§Recurrence of M.E. and P.T. following second tracheotomy two weeks later.
‖Retroperitoneal emphysema also.

case of ME in a nontracheotomized patient (with the exception of the newborn) with severe respiratory embarrassment due to asthma, tracheobronchial foreign body, mediastinal tumor, pneumonia, bronchiolitis, and the like during the past five years



A. *B.*

Fig. 8.—Experiment XIII. *A*, anterior-posterior and *B*, lateral roentgenograms showing air and lipiodol in the mediastinum

From the available evidence there are only two ways in which ME can be produced: the "extrinsic" route, wherein air is drawn into the mediastinum via the cervical fascial plans and the "intrinsic" route in which air makes its way from minute alveolar ruptures along the pulmonary vascular sheaths to the mediastinum. The Macklins favor the latter explanation and state that it may occur whenever there is an atelectasis with compensatory hyperinflation of the lung, in instances of general hyperinflation of the lung with or without increased alveolar pressure, and whenever there is a decreased blood supply to the pulmonary vessels.

It has been amply demonstrated that ME and PT can be produced experimentally in a number of ways. The Macklins have produced ME and PT by introducing air under pressure into the tracheobronchial tree in nontracheotomized cats, and from their experiments developed their theory of the

of them died, and the other most certainly would have, had mediastinal aspiration not been done. In order to illustrate the symptomatology and handling of these patients, several of the more interesting ones will be presented in detail. Cases 1, 2, and 3 have been reported previously.[1]



Fig. 2.—Lateral roentgenogram showing extensive mediastinal emphysema (Case 10).

CASE REPORTS

CASE 5.—This 14-month-old white male was admitted to the St. Louis Children's Hospital on Aug. 3, 1943, with a diagnosis of acute laryngitis. Tracheotomy afforded considerable relief. On the following day the infant exhibited moderate dyspnea without cyanosis or other symptoms. Physical signs of left PT were first noted on this day, and the chest roentgenogram (Fig. 1) revealed the findings at that time. From the left pleural cavity, 28 c.c. of air (under pressure) were aspirated with resultant respiratory relief and shifting of the heart back to its normal position. The remaining air disappeared completely over a period of eight days. Interestingly enough, two weeks later a second tracheotomy was performed, followed in several hours by ME and left PT. Pleural aspiration was not required on this occasion as no symptoms were noted; the air disappeared spontaneously over a period of eleven days.

This case is illustrative of those with mild symptoms for whom a pleural aspiration affords substantial and permanent relief. Even though small amounts

causation of pulmonary interstitial emphysema and its attendant complications. Ballon and Francis[8] produced PT by overdistending the mediastinum with air. Goldberg and his associates[4] demonstrated that mediastinal rupture occurred in the human cadaver when the mediastinal pressure was raised to 40 mm. of mercury. They noted that the mediastinal tear occurred most frequently in the region of the left inferolateral border of the thymus. Griffin[9] produced ME and PT by subjecting the chests of tracheotomized cats to decreased atmospheric pressure. DeCosta[10] found that bullous ME could be produced in dogs on some occasions by inflating the lung with pressures of 18 to 20 mm. of mercury; in other experiments he failed to do so with pressures as high as 30 mm. High inflation pressures (60 to 90 mm.) produced massive air embolism and sudden death. We have not observed air embolism in our patients or experimental animals.

Our experiments have conclusively shown that, in the dog, air can be drawn into the mediastinum from the cervical region and that PT can result from rupture of the mediastinal pleura under conditions which prevail both during and after human tracheotomy; that is, upper respiratory obstruction. The pathway taken by the air has been traced accurately by the use of trypan blue and lipiodol, and there is no doubt that it can come from above under the conditions of our experiments. In certain animals, ME resulted from only a few minutes' dyspnea; in others, it did not occur after several hours of continued respiratory distress. Pneumothorax occurred in only one animal. In this regard, the experimental animals behave much as do human patients, for ME and PT do not occur in every tracheotomized patient. A factor which remains to be determined is the critical mediastinal pressure necessary to produce rupture of the mediastinal pleura (Goldberg's experiments suggest that it must be above 20 mm. of mercury).

Our clinical data clearly show the advisability of preoperative bronchoscopy (or any other method of assuring an adequate airway during tracheotomy, such as intubation). Neffson[3] found that the incidence of PT was reduced from 18 per cent to 12 per cent through the use of preoperative intubation. Our own figures for the bronchoscoped and nonbronchoscoped patients, respectively, are 28 per cent and 50 per cent for ME and 3 per cent and 24 per cent for PT. The data also show a good correlation between the degree of respiratory distress and incidence of both ME and PT. It is interesting and significant that laryngotracheobronchitis, which was the disease present in 22 per cent of the patients in our series, accounted for 37 per cent of our cases of ME and 30 per cent of those of PT. There are two reasons for this. In the first place, the disease, involves the entire respiratory tract, so that even though laryngeal obstruction is relieved by tracheotomy, some dyspnea may continue to occur; the thick secretions present in the tracheobronchial tree make it more difficult to keep the tracheal airway free. Secondly, the extreme dyspnea and widespread pulmonary pathological changes operate to favor the production of pulmonary interstitial emphysema according to the theory of Macklin and Macklin.[7] The differences in the incidence of ME and PT in cases of laryngotracheobronchitis

These two cases are illustrative of what happens when ME and PT are neither diagnosed nor suspected. In Case 10 it is probable that ME was initiated, or at least intensified greatly, by the malposition and plugging of the tracheotomy tube. Had fluoroscopic examination of the chest been done at that time, ME would have been diagnosed and the symptoms attributed to that rather than to tracheal mucus or some other pulmonary difficulty. In Case 12 it is obvious that PT, of the extent shown in Fig. 4, could not have occurred during the few moments before death, and that had careful examinations of the chest been done during the early postoperative course, PT would have been diagnosed sooner.



Fig. 4.—Posterior-anterior roentgenogram of the chest taken the day following bilateral pleural aspiration, showing persistence of right pneumothorax (Case 6).

CASE 13.—This 14-month-old white female was admitted to the St. Louis City Hospital in 1945 with laryngotracheobronchitis; respiratory retraction was pronounced. Tracheotomy afforded considerable relief although dyspnea continued due to the bronchitis. Two hours postoperatively dyspnea became worse, retractions increased, and cyanosis and subcutaneous emphysema was noted. Signs of ME and bilateral PT developed, and their presence was confirmed by fluoroscopy. Bilateral pleural aspiration yielded considerable amounts of air under positive pressure. Relief of symptoms was only temporary, for within just a few minutes respiratory distress was again evident. During the next five hours, until the patient's death, constant attention, oxygen and stimulants were necessary. Repeated pleural aspirations were done, and finally, because the chest seemed to fill rapidly

in those patients who have lower respiratory distress as well as laryngeal obstruction (such as laryngotracheobronchitis), to promote a good exchange of air at the alveolar level. The use of an atmosphere of humidified air, the frequent inhalation of carbon-dioxide-oxygen mixtures, the intratracheal instillation of a specially prepared physiological solution* together with a vasoconstrictor such as neosynephrin, and the administration of the sulfonamide drugs and penicillin are all useful therapeutic adjuncts.

The symptomatology and proper handling of ME and PT should be thoroughly understood; what is most important, however, is that *these complications should be considered in the differential diagnosis whenever untoward symptoms develop in a tracheotomized patient.* Our statements to the effect that of the instances of ME and PT observed in our series only a certain number resulted in embarrassment to the patient should not detract from the seriousness of these complications.

"Air in the mediastinum and interstitial tissues of the lung may be occult, unrecognized by means of visible manifestations. It accompanies a wide variety of clinical conditions and respiratory diseases. Especially when it is occult, it may be malignant; when it is malignant, it can be fatal. When its presence is diagnosed, it may be withdrawn, and thus the patient's life may be saved."[7]

Had the possibility of the occurrence of ME and PT in some of our fatal cases been kept in mind, proper treatment might have produced a different outcome.

Physical examination of the chest should be done carefully and frequently in all postoperative cases, and a fluoroscopic examination or roentgenogram made whenever possible within the first six hours. Although ME may be diagnosed from an anterior-posterior roentgenogram (it is often erroneously considered to be "pneumopericardium"), a lateral view is much more satisfactory and informative. In addition to the roentgenographic findings, the only pathognomonic sign of ME is the peculiar "precordial crackle" referred to earlier in this paper. The other symptoms and signs are not diagnostic but may be of help in alerting the observer. When mediastinal emphysema becomes sufficiently pronounced, circulatory as well as pulmonary embarrassment ensues. The venous return to the heart is impeded, so that the pulse becomes rapid and weak; the blood pressure falls, and the neck veins are distended. The patient becomes dyspneic, cyanotic, quite apprehensive, and, if the process continues, exhausted to the point of coma in his fight for air. In adults, pain of a character suggestive of coronary disease may be present, and electrocardiographic changes have been described (slight elevations of ST segments, inverted T waves).[13] The patient may even experience temporary relief when the mediastinum ruptures to produce PT. The symptoms and signs of PT are too well known to invite discussion here.

The treatment of post-tracheotomy ME and PT involves two principles: the withdrawal of the air, and the prevention of its further extension or reaccumulation. In those instances in which the process is limited in extent and

*A physiological fluid of the following composition: NaCl, 0.73 per cent; KCl, 0.04 per cent; $CaCl_2$, 0.01 per cent; $MgCl_2$, 0.02 per cent; and $NaHCO_3$, 0.2 per cent prepared as described by Hartmann.[12]

if a larger tube had been used, so that air could have escaped from the pleural cavities as rapidly as it entered. Case 7 illustrates an unusual set of circumstances in that the salicylism resulted in continuance of respiratory difficulty after the tracheotomy had been completed. Although the tracheotomy tube was patent, it apparently did not allow sufficient respiratory exchange to satisfy the demands produced by the salicylate poisoning, and air continued to accumulate in the mediastinum until a larger tube was inserted. The life-saving effects of mediastinal aspiration are well illustrated here. These three cases leave no doubt that ME and/or PT can produce alarming symptoms.

EXPERIMENTAL OBSERVATIONS

Various experiments, designed to test the postulate that air can be drawn into the mediastinum from an open tracheotomy wound, were carried out on dogs. In all experiments a routine midline cervical incision was made after infiltration of the skin with 1 per cent procaine. In several it was necessary to supplement this with intravenous nembutal anesthesia. A total of thirteen experiments were done.

The first four experiments were done on 3-week-old puppies, weighing approximately 1 kg. each, with the idea (at the suggestion of Dr. A. J. Cone) of observing the phenomenon of tracheal spasm described by Cole[6] and of seeing whether this might play a role in the pathogenesis of ME. The trachea was exposed but not incised in these experiments. After preliminary roentgenograms were taken, the trachea and peritracheal tissues were mechanically stimulated with a hemostat. In one of the four dogs tracheal spasm was noted, the trachea contracting to about one-half normal size. Dyspnea ensued and continued until the animal was sacrificed three hours later. At autopsy there was a minimal amount of ME and no PT. Unfortunately, the animal had aspirated some milk, and this may have accounted for the dyspnea. In the other three dogs, the tracheal wound was filled with a dye (trypan blue), and the trachea was completely occluded with a hemostat for thirty-second periods on three occasions with resultant severe dyspnea and retraction. Roentgenographic and post-mortem examination failed to reveal ME or PT or the presence of the dye in the mediastinum of these animals.

The remaining experiments were carried out on adult dogs weighing 7 to 8 kg. Tracheotomy was done and a tracheal cannula inserted and secured firmly in place with a single tie about the trachea. This latter procedure, though objectionable because it obviously disturbs the peritracheal tissues more than is usual in human tracheotomy, was necessary in order to produce sufficient dyspnea upon occlusion of the cannula. The tracheotomy wound was then filled with a liquid radiopaque material or a dye and the tracheal cannula occluded to the point of profound dyspnea. Roentgenograms were taken at intervals, and after a suitable length of time the dog was sacrificed. At post-mortem examination the chest was opened under water.

REFERENCES

1. Forbes, G. B., and Salmon, G. W.: Mediastinal Emphysema and Pneumothorax Following Tracheotomy, J. PEDIAT. 23: 175, 1943.
2. Champneys, F. J.: Artificial Respiration in Stillborn Children—Mediastinal Emphysema and Pneumothorax in Connection with Tracheotomy: An Experimental Inquiry, Med. Chir. Tr. London (a) 65: 75, 1882; (b) 67: 101, 1884.
3. Neffson, A. H.: Tension Pneumothorax and Mediastinal Emphysema After Tracheotomy, Arch. Otolaryngol. 37: 23, 1943.
4. Goldberg, J. D., Mitchell, N., and Augrist, A.: Mediastinal Emphysema and Pneumothorax Following Tracheotomy for Croup, Am. J. Surg. 56: 448, 1942.
5. Hamman, L.: Spontaneous Mediastinal Emphysema, Bull. Johns Hopkins Hosp. 64: 1, 1939.
6. Cole, W. H.: Laryngeal Spasm and So-called Tracheal Collapse, Arch. Surg. 39: 10, 1939.
7. Macklin, M. T., and Macklin, C. C.: Malignant Interstitial Emphysema of the Lungs and Mediastinum as an Important Occult Complication in Many Respiratory Diseases and Other Conditions, Medicine 23: 281, 1944.
8. Ballon, H. C., and Francis, B. F.: Consequences of Variations in Mediastinal Pressure: Mediastinal and Subcutaneous Emphysema, Arch. Surg. 19: 1627, 1929.
9. Griffin, R. J.: Spontaneous Pneumothorax, Kentucky Med. J. 39: 284, 1841.
10. DeCosta, E. J.: Spontaneous Pneumothorax of the Newborn Infant, Am. J. Obst. & Gynec. 39: 578, 1940.
11. McDowell, F.: Personal communication.
12. Hartmann, A. F.: Theory and Practice of Parenteral Fluid Administration, J. A. M. A. 103: 1349, 1934.
13. Miller, H.: Spontaneous Mediastinal Emphysema With Pneumothorax Simulating Organic Heart Disease, Am. J. M. Sc. 209: 211, 1945.
14. Iglauer, S.: Spontaneous Mediastinal Emphysema, Report of a Case, Ann. Otol. Rhin. & Laryngol. 53: 823, 1944.
15. Hammond, A. E.: Emergency Cervical Mediastinotomy in a Case of Massive Mediastinal and Subcutaneous Emphysema Secondary to Removal of a Foreign Body from the Bronchus, Ann. Otol. Rhin. & Laryngol. 53: 829, 1944.

massive ME extending to diaphragm. There was no PT. The right lung pleura contained numerous petechial hemorrhages.

Experiment VIII. Conditions of Experiment VII were repeated, using thorotrast as a contrast medium. A small amount of thorotrast entered the superior mediastinum, but there was no evidence of ME and PT either roentgenographically or at postmortem examination.

Experiment IX. Conditions of Experiment VII were repeated, using a 1 per cent solution of trypan blue to fill the tracheotomy wound. At autopsy the trypan blue was seen to have traveled almost to tracheal bifurcation, but there was no evidence of ME or PT.

Experiment X. Conditions of Experiment VII were repeated. There was moderate dyspnea for one hour and no evidence of ME or PT.



Fig. 5, *C*.—Postmortem photograph showing emphysema of the superior mediastinum and occasional streaks of trypan blue in that region. The right rib cage has been cut away.

Experiment XI. Conditions of Experiment VII were repeated. There was severe dyspnea for two hours and no evidence of ME or PT.

Experiment XII. Conditions of Experiment VII were repeated with addition of intravenous nembutal anesthesia. The animal was so depressed by the anesthetic that only mild dyspnea could be produced. Dyspnea maintained for two hours. Roentgenographic and postmortem examinations revealed a minimal amount of ME but no PT. The lungs were grossly normal.

Experiment XIII. Following intravenous nembutal anesthesia, moderate dyspnea was produced by inserting a holed cork in the larynx. Tracheotomy was then done in the usual manner. Roentgenograms taken immediately following tracheotomy revealed no evidence of ME or PT. A tracheal cannula was then inserted, the wound filled with a mixture of lipiodol and 1 per cent trypan blue solution, and the cannula occluded so as to produce moderate dyspnea. Roentgenograms were taken after fifteen minutes (Fig. 8, *A* and *B*). The dog was sacrificed after ninety minutes. Autopsy revealed considerable ME but no PT. Intimately mixed with the air in the superior mediastinum are to be seen both the trypan blue and lipiodol (Fig. 9, *A* and *B*).

During the course of a study to determine the value of oral penicillin as a prophylactic measure for the prevention of streptococcal upper respiratory infections in rheumatic subjects, the following data on the absorption and excretion of this antibiotic were accumulated.

PLAN OF STUDY

Oral penicillin* was administered over a twelve-month period to seventy rheumatic children ranging in age from 6 to 14 years, who were in the quiescent stage of the disease. A total of 100,000 units were given daily to each child in two doses. The optimum time of administration in relation to meals, variability of absorption in the same individual, and the relation of dosage to weight were studied. The penicillin tablets were all buffered with calcium carbonate, but no attempt was made to determine whether this buffer increased the absorption of the drug.

METHOD

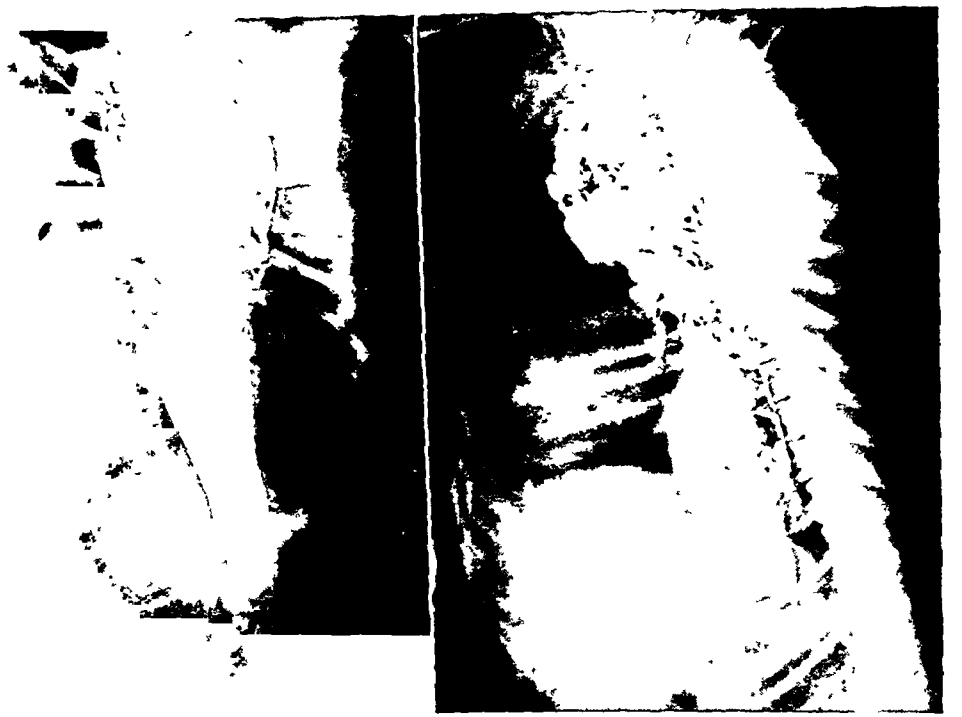
Samples of blood for the determination of penicillin levels were taken routinely thirty to sixty minutes after ingestion of the drug. Two-hour blood levels were studied in a small number of cases. Since penicillin is excreted in the urine almost entirely within the first six to eight hours,[16] close approximation of total urinary excretion was measured in eigh-hour urine specimens. Samples of urine were filtered through Seitz filters. Penicillin assays of serum and urine specimens were performed by a modification of the serial dilution method of Rammelkamp.[17] The test organism was a Group A hemolytic streptococcus C203 grown for eighteen hours in Todd-Hewitt broth. The Todd-Hewitt broth[18, 19] was modified as follows: beef was substituted for horse meat, 2 per cent neopeptone added, and sterilization accomplished by filtration through Berkefeld filters. An inoculum of 0.1 ml. of the freshly grown culture per 10 ml. of Todd-Hewitt broth was used, 0.5 ml. of which was pipetted into each of a series of ten tubes. Following the addition of 0.5 ml. of the unknown specimen to the first tube, serial dilutions were made. Similar dilutions of a standard penicillin solution beginning with a final concentration of 1 unit per milliliter in the first tube were included with each group of unknowns. After eighteen hours' incubation at 37° C., the end point was read as the lowest concentration of penicillin which would produce complete inhibition of growth. The maximum sensitivity with this method in the detection of penicillin in an unknown specimen varied between 0.031 and 0.0625 unit per milliliter.

RESULTS

A. 50,000 Units One Hour Before Breakfast.—Following the administration of 50,000 units of oral penicillin on a fasting stomach one hour before breakfast, the penicillin concentration attained in specimens of blood drawn thirty to sixty minutes later was 0.20 unit per milliliter of serum, an average based on over 500 determinations. A smaller number of assays were done on

*The penicillin buffered with calcium carbonate (Ledericillin tablets) used throughout this study was generously donated by the Lederle Laboratories, Division, American Cyanamid Co.

occurred before the trachea was incised. Goldberg and associates[4] found twelve instances of ME and eight of PT in a series of eighteen tracheotomized patients. It is entirely possible that many instances of both ME and PT were missed or their importance minimized in former days when diphtheria was a common indication for tracheotomy.



A. *B.*

Fig. 7.—Experiment VII. *A*, anterior-posterior and *B*, lateral roentgenograms taken after an additional two and one-half hours of dyspnea, illustrating the extensive collection of air and lipiodol in that mediastinum

The fact that ME and PT can occur in nontracheotomized patients raises the question of whether the tracheotomy might be merely coincidental and not a cause of these conditions. Might not the ME have been present prior to the tracheotomy? The Macklins[5] take this view and state that although air may in some cases enter the mediastinum via the cervical fascial planes, the "intrinsic" route (minute alveolar ruptures leading to pulmonary interstitial emphysema in turn leading to ME) is the most common. Although we do not have accurate preoperative data for all our patients with ME and PT, we believe the occurrence of these complications to be so intimately connected with the procedure of tracheotomy as to leave little doubt of a cause and effect relationship. In certain of our patients we are positive that ME and PT were absent prior to tracheotomy. Further, although we do not doubt that ME can occur in the way proposed by the Macklins, we have not witnessed a single

that the blood sample was obtained might account for these variations, the time factor was accurately controlled. However, it was found that even with accurate timing the serum levels varied greatly on different days. A study of urinary excretion of penicillin in eight-hour urine specimens in these individuals indicated that the absorption of the drug from the duodenum varied from day to day, as indicated by the concentration of penicillin attained in the blood, and was directly reflected by the amount of urinary excretion. The findings obtained in one such individual are illustrated in Fig. 2.

It will be noted that in this individual on days when a serum level of 0.0625 unit per milliliter was obtained, only 3 per cent of the ingested dose was found in the urine, whereas with a serum level of 0.5 unit per milliliter, 26 per cent was excreted.

Relationship of dosage to weight: The seventy children in whom serum levels in the fasting state were studied, ranged in age from 6 to 14 years and represented a weight distribution varying from 49 to 136 lbs. In order to determine whether there was any relationship between weight and dosage of oral penicillin, the children were divided into three groups: the average penicillin level in the serum of children weighing 100 lb. or more was 0.16 unit per milliliter, as compared to 0.22 unit per milliliter in children weighing between 75 and 100 lb. and 0.24 unit per milliliter in those weighing less than 75 lb. These findings suggest that in children using equivalent doses under similar fasting conditions, there is a significant decrease in blood concentrations with an increase in body weight.

B. 50,000 Units Immediately Before Breakfast.—In forty subjects 50,000 units were given five to ten minutes prior to breakfast instead of one hour before breakfast. Following this method of administration, the average level obtained in blood samples drawn thirty to sixty minutes later was 0.15 unit per milliliter as compared to the average serum level of 0.20 unit per milliliter when the drug was given one hour before breakfast. The comparative serum concentrations at thirty, sixty, and 120 minutes are presented in Fig. 1. It will be noted that when the penicillin was ingested immediately prior to breakfast instead of one hour before breakfast, the concentrations attained in the serum at thirty- and sixty-minute intervals were somewhat lower although the general pattern of absorption was unchanged.

The average urinary excretion following ingestion just prior to breakfast was 8 per cent of the ingested dose as compared to the average of 12 per cent when the penicillin was administered one hour before breakfast.

C. 50,000 Units Immediately After Breakfast.—The ingestion of penicillin immediately after meals was investigated in two subjects. Both of these individuals had previously shown good serum levels when the drug was given before meals. However, in both subjects, when 50,000 units was ingested immediately after breakfast, the penicillin assay in blood samples drawn at thirty- and sixty-minute intervals revealed negligible concentrations. These findings were in complete agreement with those of other investigators, and this aspect of the study, therefore, was discontinued.



A



B

Fig. 9.—Experiment XIII. Postmortem photographs. *A*, air and trypan blue in superior mediastinum. *B*, with the right shoulder and the first layer of neck muscles removed, the collection of air and trypan blue is seen to be continuous from the neck region into the superior mediastinum.

D. 50,000 Units Immediately Before Supper.—Since the ingestion of penicillin both one hour before and immediately prior to breakfast followed an overnight fast, it was considered important to investigate the degree of absorption following a shorter period of fasting. Accordingly, in twenty-four subjects, 50,000 units of penicillin was administered immediately before the evening meal, following a fast of approximately four hours. The average concentration attained in blood samples drawn thirty to sixty minutes later was 0.12 unit per milliliter as contrasted with an average of 0.15 unit per milliliter when the same dose was given just prior to breakfast and 0.20 unit per milliliter following ingestion one hour before breakfast.

E. 50,000 Units Two and One-half Hours After Supper.—In fifteen individuals, penicillin assays were determined in blood samples drawn thirty minutes after the evening dose. In a total of thirty such determinations, an assayable serum level was found in only one subject. However, a study of urinary excretion of penicillin in these same individuals following this method of administration revealed an excretion ranging from 2 per cent to 39 per cent of the ingested dose, with an average of 10 per cent.

DISCUSSION

The general pattern of absorption of orally administered penicillin in children does not differ significantly from that described in adults by other investigators. The rise to a maximum concentration within thirty minutes indicates the rapid passage of the drug into the duodenum, where the greatest absorption occurs.[13] The peak serum level is maintained with only a slight fall for the next thirty minutes, and then drops rapidly to a barely detectable amount at the end of two hours. Since 85 per cent of the penicillin absorbed is excreted within the first two hours, the rapid fall in the serum concentration within the same period is directly related to the excretion of the drug by the kidneys. The fact that the remaining 15 per cent is excreted within the following two to four hours suggests that there is penicillin present in the blood beyond the two-hour period but in a concentration too low to detect by the method of assay used in this study.

The maximum absorption of penicillin, as reflected by both the height of the concentration attained in the serum and the amount excreted in the urine, occurs when the drug is administered in the fasting state one hour before breakfast. Using a constant dose of 50,000 units, somewhat lower but still satisfactory serum levels are obtained when the penicillin is given five to ten minutes before breakfast or immediately prior to supper after a fast of approximately four hours. If, however, the interval following the ingestion of food is reduced from four to two and one-half hours, only negligible concentrations are attained in the serum. Our findings in children are in accord with those of previous observers who have studied adults. Thus, Finland and associates,[15] using 50,000 unit doses in aqueous solution and with a variety of buffers, found that when penicillin was ingested thirty minutes after breakfast, the serum levels were irregular and unpredictable as compared to levels obtained when the drug was administered thirty minutes before breakfast. Similarly, Broh-Kahn and

and those of pure laryngeal obstruction (where obstruction is completely relieved by tracheotomy) is evident from a study of Table V.

The age factor was also considered in our study. Not only do young children tend to suffer more acute degrees of respiratory obstruction than do older individuals, but they also present more of a technical problem to the surgeon. The operative field is smaller, thus tempting the surgeon to use a lower incision than usual (in at least one of our patients it was felt that the upper mediastinum was entered during the operation), and the patient is less cooperative and more inclined to struggle. The fact that infants have a very short neck may also be of importance, for it has been observed that ME following extensive neck dissections is somewhat more common in short-necked than in long-necked individuals.[11] Neffson states that PT occurred in his cases most frequently in the 1- to 2-year age group. Our data show no clear-cut preponderance of cases in any of the younger age groups although they do suggest that ME and PT are less likely to occur in older children.

The practical implications of our clinical observations and experimental work are clear. Efforts should be made to assure an adequate airway at all times in tracheotomized patients. The time of operation is a critical one, for it is then that the cervical fasciae are first opened and provision made thereby for the entry of air into the mediastinum. Tracheotomy should be performed as early as possible, once its need becomes apparent. If the operation can be carried out before the patient reaches the stage of extreme dyspnea, the procedure can be done less hurriedly and, consequently, more skillfully, and the likelihood of ME and PT is appreciably reduced (see Table IV). Further, in those patients exhibiting dyspnea, the assurance of an adequate airway (by means of an indwelling bronchoscope or intubation tube) at the time of tracheotomy does much to obviate the occurrence of these complications. A technical point of importance is the avoidance of lifting the pretracheal fascia away from the trachea preparatory to incising the trachea. This maneuver, through opening up another cervical fascial plane, would seem to predispose to the production of ME. The neck incision should be made as high as possible without endangering the first tracheal cartilage. If the incision is high, then retraction on inspiration may compress the lower neck tissues sufficiently to help prevent the dissection of air down the cervical fascia. In the low operation the risk of actually entering the superior mediastinum during the incision is a real one. The suggestion has been made of tightly packing off the tracheotomy wound in order to prevent the occurrence of ME. We agree with Neffson that this procedure is not indicated. It was attempted once (see Case 7) without success. It is obviously impossible to make the wound air tight by packing it with gauze, and the likelihood of infection of the wound is increased by such a procedure.

Vigilance should not be relaxed during the postoperative period, for if anything happens to obstruct the airway, ME can occur at any time. Special nursing care should be available, particularly in young children, to insure a patent, properly placed tube at all times. Case 10 illustrates the consequences of a misplaced mucus-filled tracheotomy tube. Concurrently, efforts should be made,

conditions before meals, and if necessary during the night. If it is essential that the drug be given after periods of fasting of less than four hours, the dosage should probably be increased to compensate for the diminished absorption. Other factors which should be taken into consideration are the weight of the child and the occasional variability of absorption in certain individuals.

Although the children studied were all rheumatic subjects, they were in the quiescent stage of the disease. It therefore seems likely that similar results would be obtained in nonrheumatic individuals of the same age. No studies on the treatment of acute infections with oral penicillin were included.

CONCLUSION

Satisfactory serum levels can be obtained in children following the oral administration of 50,000 units of penicillin, provided that the drug is given following a fast of at least four hours.

REFERENCES

1. Florey, M. E., and Florey, H. W.: General and Local Administration of Penicillin, Lancet 1: 387, 1943.
2. Abraham, E. P., Chain, E., Fletcher, C. M., Gardner, A. S., Heatley, N. C., Jennings, M. A., and Florey, H. W.: Further Observations on Penicillin: Growth, Assay, Production, Bacteriostatic Action, Effect on Cells, Absorption and Excretion, and Therapeutic Trial, Lancet 2: 177, 1941.
3. Rammelkamp, C. H., and Keefer, C. S.: Absorption, Excretion, and Distribution of Penicillin, J. Clin. Investigation 22: 425, 1943.
4. Libby, R. L.: Oral Administration of Penicillin in Oil, Science 101: 178, 1945.
5. Little, C. J. H., and Lumb, G.: Penicillin by Mouth, Lancet 2: 203, 1945.
6. Burke, F. G., Ross, S., and Strauss, G.: Oral Administration of Penicillin, J. A. M. A. 128: 83, 1945.
7. Charney, J., Alburn, H. E., and Bernhart, F. W.: Urinary Excretion of Penicillin in Man After Oral Administration With Gastric Antacids, Science 101: 251, 1945.
8. Ross, S., Burke, F. G., and McLandon, P. A.: Penicillin by Mouth, J. A. M. A. 129: 327, 1945.
9. György, P., Vandergrift, H. N., Elias, W., Colio, L. G., Barry, F., and Pilcher, J. D.: Administration of Penicillin by Mouth, Preliminary Report, J. A. M. A. 127: 639, 1945.
10. Welch, H., Price, C. W., and Chandler, V. L.: Prolonged Blood Concentration After Oral Administration, J. A. M. A. 128: 815, 1945.
11. Seagar, L. D., Shoemaker, W. G., Wells, M. S.: Blood Levels of Penicillin After Various Forms of Oral Administration, Am. J. M. Sc. 212: 90, 1946.
12. Broh-Kahn, R. H., Pedrick, R. F.: Some Factors That Modify the Effect of Trisodium Citrate on the Absorption of Oral Penicillin, Am. J. M. Sc. 221: 691, 1946.
13. McDermott, W., Bunn, P. A., Benet, M., Dubois, R., and Reynolds, M. E.: The Absorption, Excretion, and Destruction of Orally Administered Penicillin, J. Clin. Investigation 25: 190, 1946.
14. McDermott, W., Bunn, P. A., Benoit, M., Dubois, R., and Haynes, W.: Oral Penicillin, Science 101: 228, 1945.
15. Finland, M., Meads, M., and Ory, E. M.: Oral Penicillin, J. A. M. A. 129: 315, 1945.
16. Free, A. H., Leonards, J. R., McCullagh, D. R., and Biro, B. E.: The Urinary Excretion of Penicillin After Oral Administration to Normal Human Subjects, Science 100: 431, 1944.
17. Rammelkamp, C. H.: A Method for Determining the Concentration of Penicillin in Body Fluids and Exudates, Proc. Soc. Exper. Biol. & Med. 51: 95, 1942.
18. Todd, E. W., and Hewitt, L. F.: A New Culture Medium for the Production of Antigenic Streptococcal Hemolysin, J. Path. Bact. 35: 973, 1932.
19. Swift, H. F., and Hodge, B. E.: A Simple Prepared Broth for Producing Hemolytic Streptococcal Hematoxin (streptolysin), Proc. Soc. Exper. Biol. & Med. 30: 1022, 1933.
20. Cutting, W. C., Halpern, R. M., Sulton, E. H., Armstrong, C. D., and Collins, C. L.: Administration of Penicillin by Mouth, J. A. M. A. 129: 425, 1945.

is not causing undue symptoms, application of the latter principle is all that is necessary. If liberal amounts of oxygen are provided and the airway made to function properly, the patient will usually suffer no further harm, the air being resorbed from the mediastinum or pleura in a few days. However, if air continues to accumulate within the mediastinum and/or pleural cavity to the detriment of the patient, then in addition to the above measures it must be removed. A single pleural aspiration, using an oiled syringe and a small gauge needle is often all that is needed to reduce the tension sufficiently within the pleural space and provide relief from PT (see Table VIII). If air continues to enter the pleural space, then a closed system of intercostal siphon drainage must be provided. The intercostal tube should be large enough to drain the air from the pleural space as rapidly as it enters via the mediastinum, or else the tension will not be relieved (see Case 13).

The treatment of ME is somewhat more difficult. Simple aspiration was successful in one of our patients (Case 7) and failed in another (Case 2). The technique consists of entering the second or third intercostal space just lateral to the sternum and directing the needle, attached to a sterile oiled syringe, toward the midline of the thorax. The danger of entering the heart or one of the great vessels is lessened by virtue of the fact that these structures are pushed posteriorly by the collection of air in the mediastinum. Because the air is often present as numerous varied-sized bubbles, it is necessary to explore cautiously the anterior mediastinum in order to remove any quantity of air. Cervical mediastinotomy has also been successful in the treatment of mediastinal emphysema.[14, 15]

CONCLUSIONS

In a study of 120 consecutive post-tracheotomy cases at the St. Louis Children's and City Hospitals during the past four and one-half years, the incidence of mediastinal emphysema and pneumothorax was found to be appreciable, mediastinal emphysema being diagnosed in 25 per cent and pneumothorax in 10 per cent of the cases.

Mediastinal emphysema and pneumothorax were produced in tracheotomized dogs under experimental conditions by obstructing the tracheal cannula to the point of dyspnea. Using lipiodol and trypan blue as tracers, the course of the air followed from the tracheotomy wound into the mediastinum was outlined. In one animal, actual rupture of the mediastinal pleura with resultant pneumothorax was observed.

The value of providing an adequate airway at the time of tracheotomy, by means of an indwelling bronchoscope, in lowering the incidence of mediastinal emphysema and pneumothorax was amply demonstrated in our clinical material.

The prevention of mediastinal emphysema and pneumothorax, the diagnosis of these conditions, and their proper handling are discussed. Their potential seriousness is emphasized.

We wish to express our appreciation to Dr. Theodore Walsh, Professor of Otolaryngology, Washington University School of Medicine, and to Dr. Leo Wade, former director and Dr. Cyril Costello, present director of the St. Louis City Hospital, for their kindness in extending to us the facilities of their laboratories.

existence. Though many of the external and internal stimuli are now different, his reaction to them is qualitatively similar to that which it was before birth. Physical activity at this time is at an infracortical level and the responses are purely reflex in character. External stimuli, such as restraint or pain, or internal stimuli, such as produced by the intrinsic hunger contractions, all produce physiological tension which is released as crying and mass activity. Psychologically, at this age the infant is in a state of primary omnipotence. He is unaware of his environment as related to himself. He is aware only of his own tension and its release.

As maturation proceeds, physical activity gradually becomes more purposeful and voluntary. Cortical control has begun to emerge. Simple reflexes are progressively elaborated to complicated reactions under voluntary control. The state of primary omnipotence of the newborn is gradually replaced by an awareness of the relationships of self to environment. Certain aspects of growth, particularly the refinements of behavior, are being seriously influenced by the environment in which they occur. One may refer to this process in the physiological sense as conditioning, though in the broadly psychological sense it involves an adaptation to reality.

The instinctive need for food is physiologically expressed through the medium of hunger contractions. Pain occurs and tension accumulates as a direct result. It is well known that there is a great variability in the chronological rhythm with which these contractions occur. This rhythm differs from infant to infant and in the same infant at different times, but as growth proceeds, hunger occurs with progressive regularity. It is obvious, then, that any feeding schedule which provides for the presentation of food to the young infant at regular intervals is physiologically unsound. Such a schedule would not anticipate the natural rhythms of hunger and, therefore, food would be offered when it was not required, and withheld when it was demanded. This is not vitally important in the infant's nutritional economy, for he is dogged in his refusal to eat when not hungry and his capacities are surprising when he needs food.

The emotional aspects of hunger are also concerned with the irregularity with which hunger contractions occur. During the newborn period hunger contractions evoke tension and pain which is released by crying. The cry brings the mother and food. Gratification of an instinctual need occurs. At this point the mother and even the food is not recognized as part of the environment. When the feeding program is adjusted to the individual rhythm of the infant, hunger is always followed by gratification. When there is gratification, the sensory apparatus is released for ultimate recognition of an intermediary between hunger and gratification, the mother. When the feeding experience is satisfying and not frustrating, the infant comes to have confidence in the mother and his environment. He can depend upon the certain satisfaction of his instinctual needs and has learned to wait; he has made his first adaptation to reality. Equipped with a new attribute, confidence, all of his senses are expanded so that the rooting at the breast, handling of the breasts, the odor and taste of the milk, the sight of the mother, and the sound of her

A STUDY OF THE ABSORPTION AND EXCRETION OF ORAL PENICILLIN IN CHILDREN

MILTON MARKOWITZ, M.D., AND ANN G. KUTTNER, M.D.
IRVINGTON-ON-HUDSON, N. Y.

AN INCREASING number of reports have been published recently which indicate that with adequate dosage, effective blood levels may be obtained following oral administration of penicillin. Early investigators, Florey and associates,[1-3] Abraham and associates,[2] and Rammelkamp and Keefer,[3] found that only small amounts of penicillin were detected in the blood and urine following oral administration, indicating that although absorption did occur, it was variable and of a small degree. Since it was known that penicillin was unstable at a low pH, it was thought that gastric acidity might account for the low blood levels.

The majority of the recent studies[4-12] have been concerned with attempts to protect penicillin against the acidity of the stomach by the use of various combinations of antacids and protective coatings. Although it is still not clear which of these vehicles is the most efficacious, most authors state that following the simultaneous administration of buffers, higher blood levels were obtained than when an equivalent amount of penicillin was given in aqueous solution. The findings of McDermott and his co-workers,[13] however, indicated that gastric acidity was probably not a major factor in the destruction of orally administered penicillin. In studying patients with achlorhydria, they found that the degree of absorption, as measured by the urinary excretion of penicillin, was no greater than that observed in subjects with normal acid secretion. In an earlier study,[14] the same authors found that following various methods of oral administration in the same fasting subject, there was no difference in the concentration attained in the blood, regardless of whether penicillin was administered with a protective agent or in aqueous solution. Similarly, Charney and associates[7] noted that when oral penicillin was given on a fasting stomach the amount of urinary excretion was increased only slightly by the simultaneous administration of a buffer substance. Finland and his co-workers[15] also reported that the blood concentrations obtained following the ingestion of penicillin in aqueous solution were as high as with any special preparation, with the possible exception of aluminum hydroxide gel, and that the relationship to meals rather than the addition of buffer was an important factor in determining the amount of absorption. Although there is still a divergence of opinion in regard to the importance of the destructive action of gastric acidity on penicillin, it is generally agreed that the presence of food in the stomach influences absorption markedly.

From Irvington House, Irvington-on-Hudson.
This study was aided by funds raised through the cooperation of Mr. Ralph B. Rogers.

a delayed but greater gain. An early basic security as acquired through past feeding experiences, and sensory satisfactions will enable him to keep his instincts and hunger in check and to wait for the mother whom he has learned has never failed him. This capacity to weigh the demands of the instincts and pleasure needs is slow in growing and is acquired only by a repetition of safe and pleasant experiences over a long period of time. Unsatisfied hunger in a 6-week-old infant produces a rage reaction. A 3-year-old whose early instinctual life has been gratified feels secure; he knows that he is loved and has learned through experience that his patience will be fully rewarded by a mother whose dependability has never failed him. In fact, his compliance is a reciprocal gift for her goodness and love. The less fortunate 3-year-old who is not genuinely loved or who, because of lack of parental insight, has been denied the gratification of his elementary needs, will not be able to wait. He will not give patience, consideration, compliance, and love because he has received none. He has not been able to progress emotionally much beyond the 6-week-old infant whose only reaction to frustration is rage.

CONCLUSION

The security which arises from the gratification of primitive instinctual needs by self-demand feeding regimes and other forms of sensory indulgence is an important asset for later emotional learning experiences; the older infant who feels secure can then begin to accept the training programs involving denial and frustration.

samples drawn at accurately timed intervals of thirty, sixty and 120 minutes after administration of the drug. The average values of penicillin concentrations obtained at these intervals are presented in Fig. 1.

It will be noted that the maximum level of 0.29 unit per milliliter of serum was reached in thirty minutes, fell only slightly to 0.25 unit per milliliter at the end of sixty minutes, and then dropped to a low level of 0.04 unit per milliliter at the end of 120 minutes. No detectable levels were found beyond two hours.

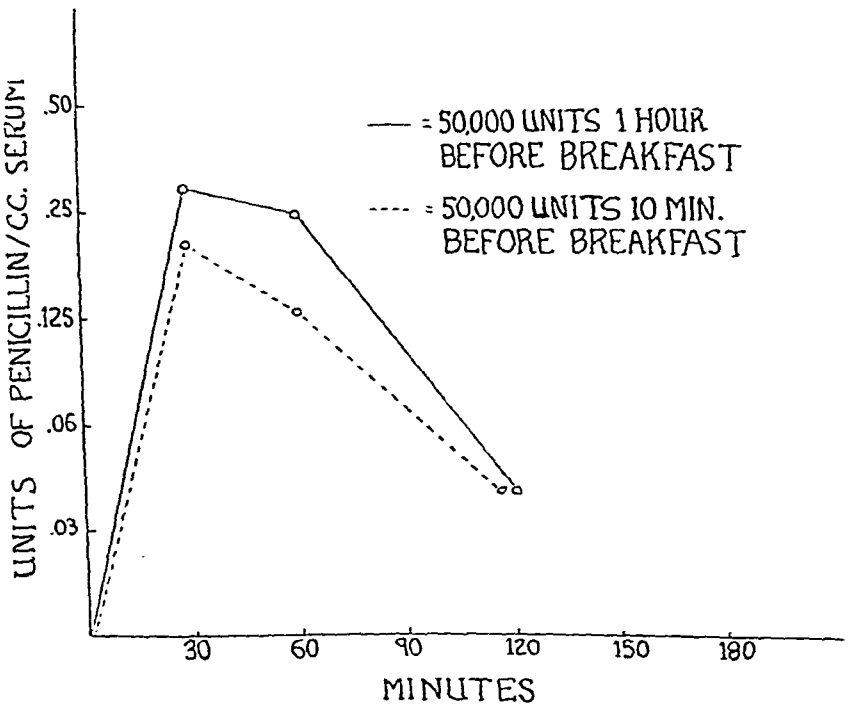


Fig. 1.—Penicillin serum levels following the administration of 50,000 units one hour before breakfast and ten minutes before breakfast. Individual figures are based on average of assays in twenty individuals.

The amount of penicillin excreted in eight-hour urine specimens following its administration in the fasting state ranged from 2 to 46 per cent of the ingested dose, with an average of 12 per cent in ten subjects so studied. Within the first 2 hours, 85 per cent of the penicillin was excreted and at the end of four hours about 99 per cent of the total penicillin excreted was present in the urine. Subsequent urine specimens contained only traces of penicillin.

Variability in absorption.—In the majority of children studied, namely fifty-five of the seventy, the serum levels obtained in determinations done on different days tended to remain remarkably constant. In the remaining fifteen children, on the other hand, marked day-to-day variations were observed. To exclude the possibility that in these fifteen individuals the maximum level was maintained for a shorter period of time and that slight differences in the time

straint apparatus. The child is also less distressed when held by this apparatus and the transfusion is administered with less difficulty.

The head restraint apparatus is illustrated in Fig. 1. The apparatus consists of four 7-inch posts and two 6-inch posts mounted on a metal base. There is also an extra post which can be attached at position *a*. Four arms are clamped to the post by an adjustable clamp as shown in the insert, Fig. 1. Various sized head pieces can be screwed to the ends of the arms to fit any shaped head. The arms of the apparatus are then adjusted to the various posts,

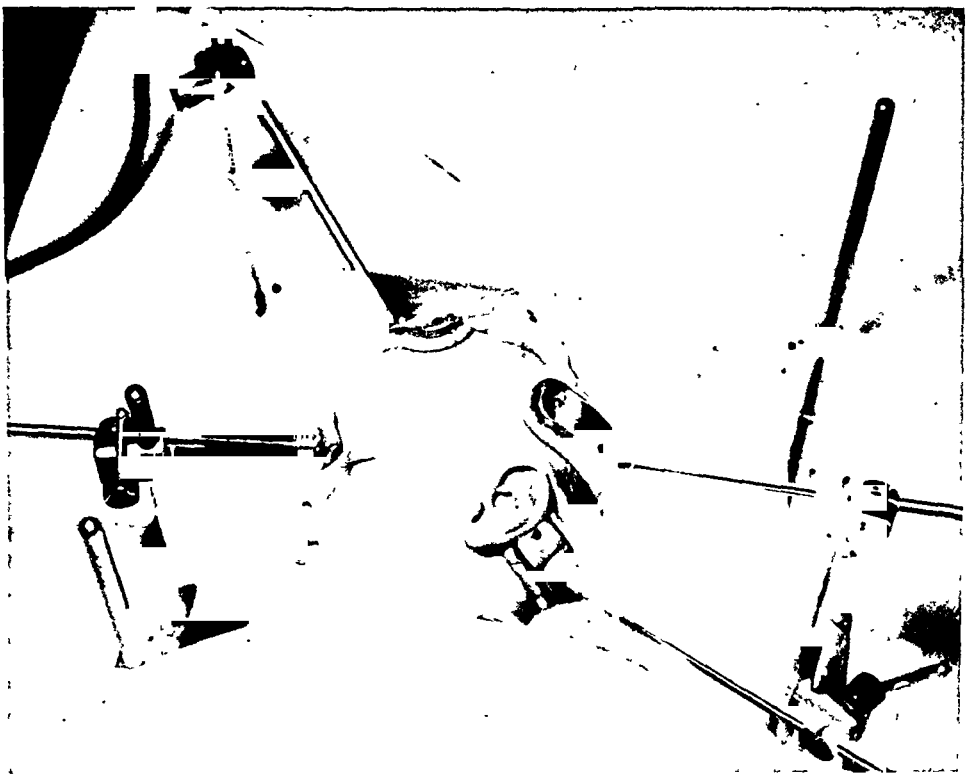


Fig. 2.—Illustration of the method of holding the head in the lateral position during a scalp vein transfusion.

depending on the size and shape of the child's head. One arm is fitted with a nose-piece which is applied to the base of the nose. The head rests on a suspended rubber sheet, and the head and nosepieces are adjusted as demonstrated in Fig. 2. It is important to have the child well restrained and to fasten the shoulders and body to the table by a sheet as illustrated in Fig. 2. As well as the lateral position, the head can be held securely in the upright position by adjusting the arms from the 6-inch posts contacting each side of the head in the parietal region.

The leg restraint apparatus allows the lower limbs to be held securely while the intravenous is being started and while fluids are being administered. This

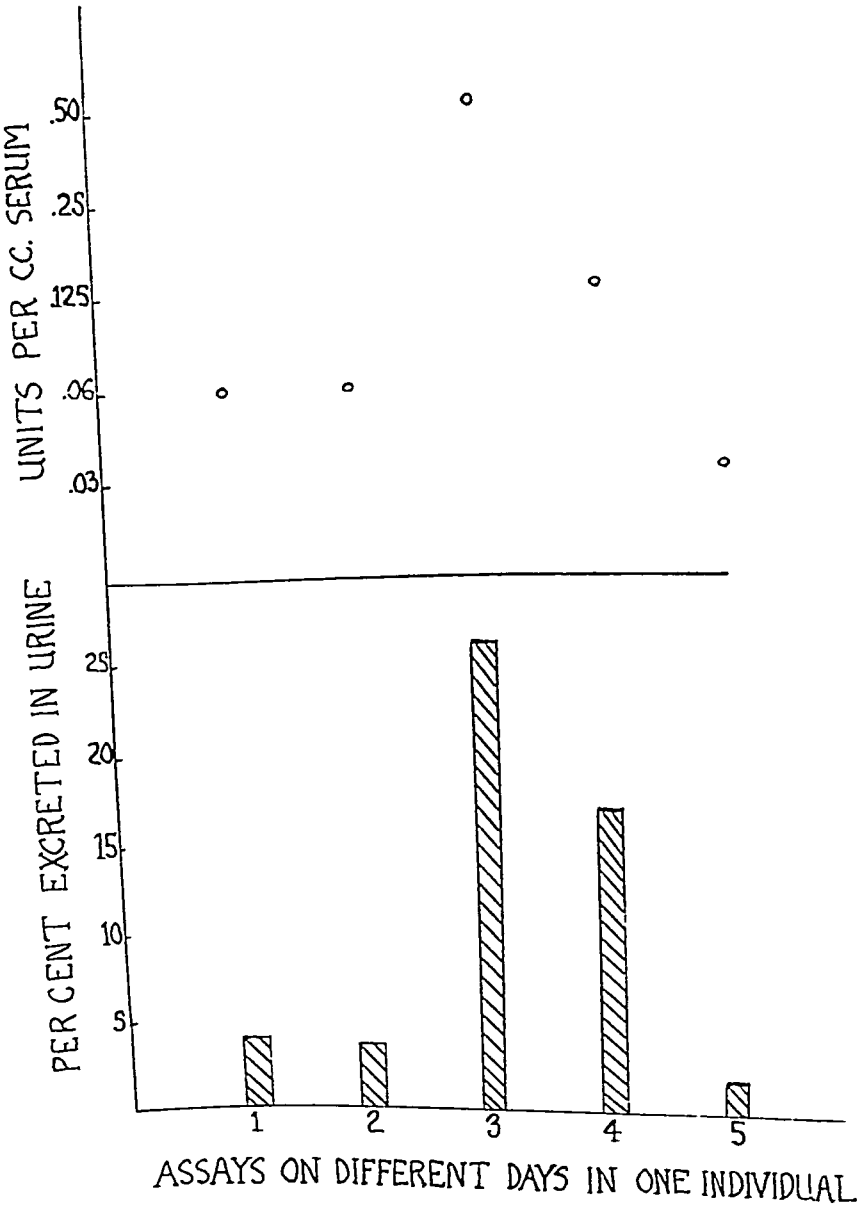


Fig. 2—Comparison of concentrations in sera thirty minutes after ingestion of drug and per cent of ingested dose excreted in eight-hour urine specimens in one individual who showed marked variations from day to day following administration of 50,000 units one hour before breakfast.

method of restraint has saved considerable time formerly spent in fastening the legs by various methods while carrying out this procedure.

The leg restraint apparatus is illustrated in Fig. 3, *A*. This apparatus consists of a metal base on which is fitted an adjustable, padded clamp and a metal bar. The child lies on the metal base and one leg is placed in the clamp. The other leg, on which the intravenous is to be started, is strapped to a padded splint with adhesive tape. The bar is then inserted between the leg and the splint and attached to the base by two screws, as shown in Fig. 4. In Fig. 3, *B*, is illustrated the adjustable leg restraint which can be attached by straps to a cot or to an operating table.

This apparatus was originally constructed in the Orthopedic Shop of the Hospital for Sick Children, Toronto. Information regarding this apparatus may be obtained through J. F. Hartz and Company, Toronto, Ontario.

Erratum

In the article entitled, "Acute Glomerulonephritis" by Burke and Ross in the February, 1947, issue of the JOURNAL OF PEDIATRICS, on page 170, line 6, the dose of Digifolin was stated to be one cat unit per 100 lb. body weight. This should have read one cat unit per 10 lb. body weight.

Pedrick,[12] employing doses of 50,000 and 100,000 units without buffer, reported negligible serum levels one hour after breakfast, although the 100,000 unit dose given one hour before breakfast resulted in adequate levels.

The mechanism by which food interferes with the absorption of penicillin is not fully understood. According to McDermott and associates,[13] food tends to exert a buffering action on gastric acidity. In their opinion, food inhibits absorption mainly by mechanical means and by delaying the gastric emptying time. Broh-Kahn and Pedrick,[12] on the other hand, believe that gastric secretion is stimulated by the ingestion of food and hence greater destruction occurs in the postprandial state. These workers as well as György and associates[9] and Charney and associates[7] obtained satisfactory serum levels when penicillin buffered with trisodium citrate was administered after meals. In contrast to these investigators, in this study no evidence was obtained to suggest that buffering the penicillin with calcium carbonate increased absorption after meals. When the drug was ingested two and one-half hours after the evening meal, except for a single determination in one individual, no assayable serum levels were found. However, the average per cent of urinary excretion following this method of administration (10 per cent) compared favorably with that observed when the drug was ingested in the fasting state (12 per cent). These findings suggest that the presence of food in the stomach does not increase the destruction of penicillin to any great degree. It seems more likely the food delays gastric emptying time to the extent that the ingested penicillin reaches the duodenum in smaller concentrations, and assayable serum levels are not obtained.

The marked variability of blood concentrations observed in the same individual on different days which occurred in fifteen of the seventy children has been difficult to explain. If the amount of penicillin excreted in the urine is an approximate index of absorption,[13] studies of urinary excretion in these individuals indicate that the degree of absorption varies from day to day even in the fasting state. At the present time no adequate explanation of the variation in absorption observed in certain individuals is available. It seems possible that emotional factors even in the fasting state might influence the motility of the gastrointestinal tract.

Our results suggest that there is some relationship between dosage and weight. Using equivalent doses under similar fasting conditions, a significant decrease in blood concentration with increasing body weight was observed. The fact that most observers[12, 20] obtained only negligible blood levels with doses of 50,000 units in adults, in contrast to our findings in children, also indicates that there is a relationship between dosage and weight. Ross and associates,[6] on the other hand, comparing the blood levels of adults and children following ingestion of 100,000 units, found no difference between the penicillin concentrations in both age groups. Their findings suggest that the weight factor is probably less important when large doses are used.

In our opinion, oral administration of penicillin is a satisfactory procedure in children, provided that the drug is given as nearly as possible under fasting

It was felt that she had an obstructive lesion in the biliary tract, probably a choledochus cyst.

Operation.—Performed Aug. 17, 1946, by Dr. Felda Hightower.

The gall bladder was distended. A large cystic mass was found below the neck of the gall bladder. Exploration revealed that this was the dilated common duct. No calculi were found. An anastomosis was made between the common duct and the second portion of the duodenum. Culture from the gall bladder was sterile.

Postoperative Course.—The course was uneventful except for two days of unexplained fever. The icterus cleared rapidly. The liver was palpable 3 cm. below the costal margin when she was discharged on the fifteenth postoperative day.

Laboratory Findings on Discharge.—Serum bilirubin was 2.3 mg. per cent; cholesterol, 204 mg. per cent; total serum protein, 6.5 Gm. per cent; bile test on the stool, strongly positive.

Five months after discharge the parents wrote that the patient had had no recurrence of symptoms and was well.

COMMENTS

The only unusual feature in this case was the absence of a palpable tumor. The coincidental improvement when choline was given erroneously supported the diagnosis of hepatitis, and delayed exploration at least twenty months.

DISCUSSION

The numerous case reports since the excellent review of Gross[1] have added no new information concerning the etiologic factors in this condition. The etiology and the mechanism of the recurrent jaundice remain obscure. The common triad of symptoms is jaundice, right upper quadrant pain in the abdomen, and a palpable tumor. This triad has been present in about 60 per cent of the cases. About 85 per cent of the patients have been females. The mortality in those cases in which the diagnosis had been considered preoperatively was approximately half that in the remainder.[4] Few long-term postoperative observations have been made in these patients. McWhorter[5] reported a woman who had a normally functioning biliary system thirteen years after operation. Cirrhosis[6] and biliary calculi[7] have been reported as complications. There are no reports of spontaneous cure.

SUMMARY

A case of idiopathic dilatation of the common duct in a 4-year-old girl with successful operation is reported.

The importance of considering the condition in recurrent jaundice in childhood is emphasized.

REFERENCES

1. Gross, R. E.: Idiopathic Dilatation of the Common Bile Duct in Children, J. PEDIAT. 3: 730, 1933.
2. Berkely, H. K.: Idiopathic Dilatation of the Common Bile Duct in Childhood, J. PEDIAT. 14: 79, 1939.
3. McCue, C. M.: Choline in the Treatment of Jaundice in Infancy, J. South Carolina M. A. 41: 32, 1945.
4. Shallow, T. A., Eger, S. A., and Wagner, F. B., Jr.: Congenital Cystic Dilatation of the Common Duct. Case report and review of literature. Ann. Surg. 117: 355, 1943.
5. McWhorter, G. L.: Congenital Cystic Dilatation of Bile and Pancreatic Ducts, Arch. Surg. 38: 397, 1939.
6. Swartley, W. B.: Choledochus Cyst; final report of two cases, Ann. Surg. 118: 91, 1943.
7. Hutchins, E. H., and Mandorfer, G. B.: Congenital Cystic Dilatation of the Common Bile Duct With Sequellae, J. A. M. A. 125: 202, 1944.

SELF-DEMAND FEEDING AND INDULGENCE IN EARLY INFANCY

GUSTAVE F. WEINFELD
HIGHLAND PARK, ILL.

MANY pediatricians believe that psychiatric principles have overemphasized liberty and permissiveness in the guidance of infants and children. They feel that "old-fashioned discipline" with its adult imposed restraints on behavior could be better relied upon to produce a generation of emotionally stable adults. There are countless examples in clinical experience, of parents and others who, under the guise of misinterpreted psychiatric concepts, have eschewed all repression, restraint, and inhibition in the guidance of their children. This is contrary to better psychiatric thought, which has recognized for a long time that overpermissiveness was not salutary for the older child. This does not apply, however, to the newborn and young infant, whose instincts and pleasures must be indulged and nourished if orderly emotional growth is to ensue.

Pediatrics is not, and never has been, exclusively a science of the cure and prevention of disease. The pediatrician is as much the pedagogue as is the academic teacher or the spiritual adviser. In fact, his influence is greater, because upon him falls the responsibility of directing the emotional development of the individual at a time in life when all the patterns of later life are being formed. This important role cannot be fulfilled without a knowledge of the nature of emotional growth trends and needs, any more than physical growth can be directed without a knowledge of the physiology of growth.

Nature did not intend that an infant should go through life receiving a constant stream of nutrition through his umbilical cord. Nor did she intend for him to be permanently spared the harsh impingement of physical forces by the protection of amniotic fluid and a uterine cloister. She endowed the normal infant with many capacities for his protection, the perception of his experiences, and the integration of them into a personality and character structure. The timing, dosage, and modification of the stimuli are important factors in the development of security and emotional growth.

During the early period of development, the mouth leads all other organs and sensory areas as a source of gratification, pleasure, and learning. Other forms of sensory perception are important, but they are secondary to the dominant oral needs. Feeding techniques and routines can provide the infant with the orderly learning of the pleasant uses of all his emerging senses and the gradual dawning that there can be safety and comfort in the ever increasing relinquishments and adaptations that society demands of him.

For some time after birth, the newborn infant functions with the same neuromuscular endowment which he had at his disposal during his intrauterine

Read at the annual meeting of the Mental Health Committee, American Academy of Pediatrics, Pittsburgh, Pa., Feb. 25, 1947.

From the Department of Pediatrics, University of Illinois.

During her stay in the hospital the baby's general health remained very good. The condition of the skin was followed very closely. It was noted that new crops of vesicles would appear at about two- to four-day intervals. These vesicles were found scattered over both upper and lower extremities, the back, in the axillae, behind the ears, and in the inguinal folds (Fig. 1). The lower anterior chest and abdomen were spared. When first seen, the vesicles contained clear fluid. These would then rupture within the following twenty-four to forty-eight hours with a localized desquamation subsequently occurring. Oozing and maceration of the skin was quite marked in the folds. Considerable crusting of the scalp was also present. By the time the patient was discharged on Sept. 5, 1946, there was present, however, only a slight crusting of the scalp and a pigmentation of the upper and lower extremities. The discharge diagnosis was pemphigus neonatorum congenitus.



Fig. 1.—Photograph of first patient, taken on fifth day, showing involvement of the scalp, forehead, upper chest, and both upper and lower extremities.

Local medications used at various times were 5 per cent sulfathiazole ointment, zinc oxide, and boric acid ointment. At one time penicillin, 10,000 units, was given intramuscularly every three hours for a period of three days.

The following history and information were obtained from the mother, and the records of the Cumberland and another local hospital.

In 1934, the patient delivered a normal male at the Cumberland Hospital after having attended the prenatal clinic. Her blood Wassermann at the time was negative. In 1935, a girl was delivered at the Cumberland Hospital, and the Wassermann at the time was negative.

On Aug. 31, 1936, the mother attended the prenatal clinic and was told that she had "what looks like a healed secondary skin eruption." The blood Wassermann done with the cholesterin antigen was one plus, while with the alcohol antigen it was negative. The diagnostic and exclusion blood Kline were both one plus. The mother was then referred to an antisyphilitic therapy clinic. She received weekly intravenous and intramuscular injections for one year and was then discharged as cured.

On Oct. 3, 1936, a full-term female baby was delivered at the Cumberland Hospital. "Baby had vesicles scattered over its body. Lesions developed more characteristically, becoming generalized pemphigus." X-ray of the long bones was negative for osteochondritis. The baby's blood Wassermann was negative on Oct. 24, 1936, while that of the mother was one plus. The baby was followed in the clinic up until Jan. 6, 1940, never showing any signs of congenital syphilis. During that time, six blood Wassermann tests were all negative.

voice, in fact all his perceptual senses, are constantly enlarged for the purpose of exploring reality. Under such circumstances, he is able to keep his instinctual need—hunger—in abeyance, deriving preliminary satisfaction through investigating the elements of his environment which he has learned through experience are the source or the means to his larger and more basic gratification, the relief of hunger.

There can be no doubt that the ideal feeding program should be based on the individual physiological and emotional needs of the infant. Such a program involves no fixed schedule whatsoever and the infant is offered food whenever he is hungry. The validity of this concept has been repeatedly established by numerous carefully controlled clinical experiments and observations. Some parents and pediatricians continue to resist the employment of self-demand schedules and refer to them disdainfully as a "newfangled idea." The idea, of course, is really as old as Nature, and was succinctly expressed by St. Marthe in 1584 in his Pediatrophia:

> "The hours of suckling it I do not fix
> Nature in that must guide the nursing sex
> When by its cries it calls you, do not spare
> Your labor, nor be loath your breasts to bare."

A few mothers find it difficult to employ what they consider a too liberal and revolutionary type of feeding and training regime. Usually they are women with a compulsive type of personality for whom orderliness and regularity are their sole protection against their own anxieties. For these parents, other less damaging outlets can be provided for their compulsions; these involve hours of bathing, types of clothing, exercise, room temperature, etc. These failing, a fixed schedule may be less thwarting to the infant's growth than the effects of a mother who is anxiety ridden by her anticipation of an unpredictable feeding time.

There is another type of mother who for one reason or another consciously or unconsciously rejects her infant. She eagerly accepts the authority of her pediatrician and sets about to fondle her baby and employ a self-demand schedule with grim determination as if these were inflexible tools in her hands. Such a mother may intellectually appreciate the rationale of the techniques involved, but emotionally she is unable to execute them. She fails because her frigidity, anxiety, or fear renders her incapable of creating infantile gratification and security regardless of techniques employed.

Many parents believe that feeding the baby when he is hungry, allowing him to suck whenever he wishes, fondling or rocking him, and even speaking softly to him will stunt the development of his moral strength. They feel that because of such permissiveness and indulgence he will never learn to keep his impulses in check or hold his needs for sensory pleasure in abeyance. There is, of course, no danger that this will occur. The newborn is not endowed with any faculties for consciously testing the interplay of his instinctual wishes with the forces of reality. It requires many months before the infant is capable of deciding whether his immediate instinctual gratification is more important than

Both streptococci and staphylococci have also been assigned the role as the causative agent. Two of our cases showed staphylococci while another showed gram-positive diplococci. The latter may have eventually grown out to have been either a staphylococcus or streptococcus.

The mothers of the cases reported in the literature were all healthy and manifested no external lesions. We feel that in our case there must have existed a close relationship between the skin lesions of the mother and those of the siblings. The mother had been subject to attacks of outcroppings of small blisters around her neck which would eventually dry, crust, and disappear, a course closely followed by the skin lesions of her children. These attacks had become more severe with each succeeding pregnancy. It is highly possible that there might have been a transmission of the infection from the mother by transplacental or hematogenic means. Unfortunately, no cultures or smears of the mother's cutaneous lesions had ever been done.

SUMMARY

1. Five cases of pemphigus neonatorum congenitus are added to the previously reported cases.

2. In only two previous instances has the disease been definitely reported as occurring in siblings. All five of our cases were in siblings.

3. The similarity of skin lesions suggests a transplacental or hematogenic spread of the infection from the mother to the infants.

REFERENCES

1. Labardt, A., and Wallart, J.: Ueber Pemphigus Neonatorum Simplex Congenitus, Ztschr. f. Geb. u. Gynäk. 61: 6000, 1908.
2. Grosz, A.: Arch. Dermat. u. Syph. 63: 373, 1902.
3. Reed, C. B.: Impetigo or Pyodermatitis Neonatorum, Arch. Dermat. & Syph. 18: 26, 1928.
4. Freeman, C. D.: Impetigo Neonatorum Congenita, Arch. Dermat. & Syph. 24: 1058, 1931.
5. Rucker, M. P.: Repeated Neonatal Deaths From Impetigo Neonatorum, South. M. J. 27: 540, 1934.
6. Weston, W., Jr.: Congenital Pemphigus Neonatorum, South. M. J. 29: 905, 1936.
7. Daniel, W. W., and Ayer, A. J.: Congenital Pemphigus, J. M. A. Georgia 26: 196, 1937.

METHOD OF HOLDING THE HEAD FOR SCALP VEIN TRANSFUSIONS AND RESTRAINING THE LEGS FOR INTRAVENOUS THERAPY

PETER H. SPOHN, M.D., AND TAYLOR STATTEN, M.D.
TORONTO, ONT.

AN IMPORTANT feature in successfully carrying out many pediatric procedures is to have the child securely restrained. This is particularly the case when attempting to keep a needle in a superficial scalp vein, or in cutting down on a vein for continuous intravenous therapy. Two types of apparatus have been devised at the Hospital for Sick Children which have proved useful for holding the head and lower limbs of the patient while carrying out these procedures.

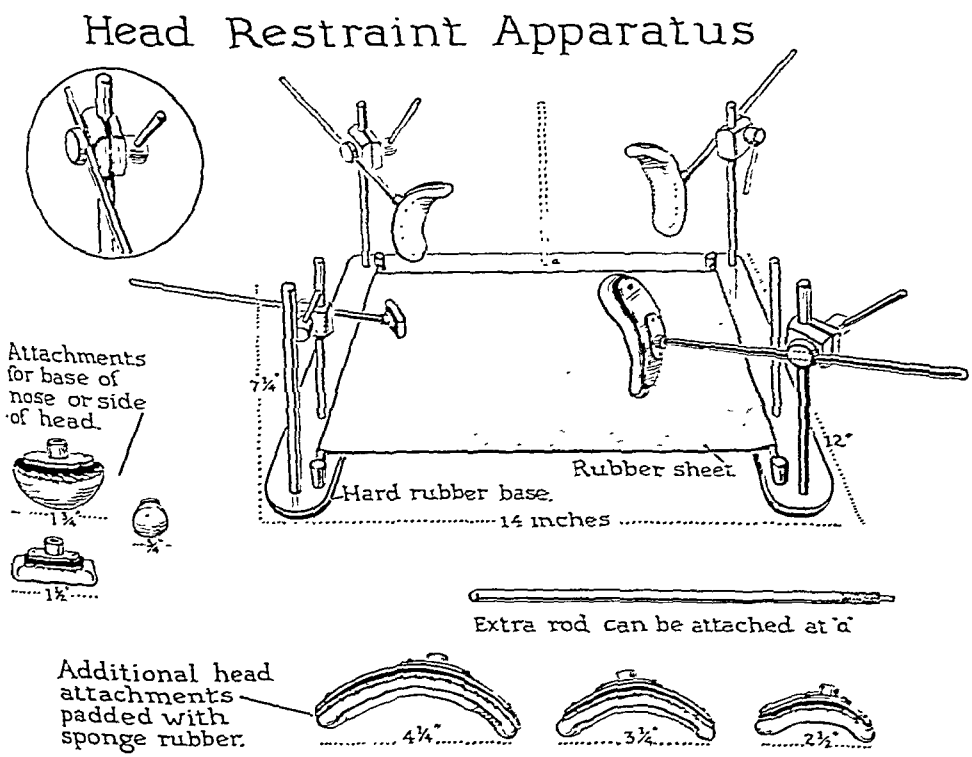


Fig. 1.—The head restraint apparatus.

Formerly it was necessary to have the child held by a nurse while performing a scalp vein transfusion. This is a very tedious task for the nurse and experience has shown that the head can be held more securely in the head re-

From the Hospital for Sick Children and the Department of Paediatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P. (London).



Fig. 1.—Ante-mortem photograph of infant showing tumor in the abdominal wall.



Fig. 2.—Gross appearance. The neoplasm presents a smooth, firm, trabeculated, white, and glistening cut surface.

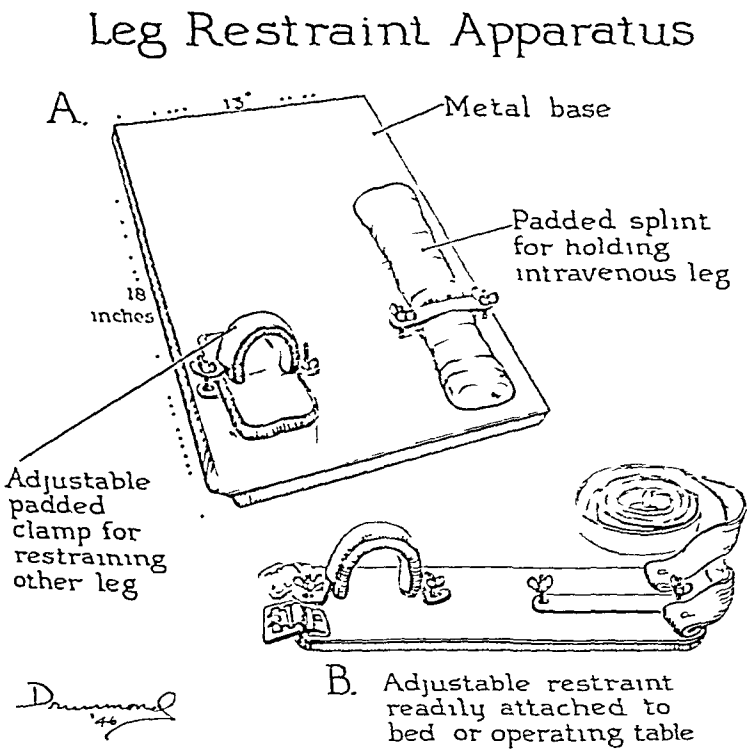


Fig. 3.—*A*, The leg restraint apparatus *B*, The adjustable leg restraint apparatus



Fig. 4.—Illustration of the method of holding the legs while giving continuous intravenous fluids.

LIPOCHONDRODYSTROPHY (GARGOYLISM)

M. E. LAHEY, M.D., R.D. LOMAS, M.D., AND T. C. WORTH, M.D.
HOUSTON, TEXAS

LIPOCHONDRODYSTROPHY is a rare familial disease of undetermined etiology. In its fully developed state the clinical appearance is that of a retarded, disproportionate dwarf with gargoylelike facies, corneal opacities, kyphosis, and a protuberant abdomen. In addition to the name used here,[1] the disease is variously known as Hurler's Syndrome,[2] gargoylism,[3] and dysostosis multiplex.

While the appearance at birth may be normal, some signs of the disease are almost always evident in the second six months of life. The earliest of these signs may be the corneal opacities, enlargement of the head, dorsolumbar kyphosis, developmental failures, or a combination of these. As time passes, and usually by the age of 4 years, the disease in its entirety is manifest. Dwarfism is apparent, and the trunk seems too short for the legs. The head is large, may be deformed, and the neck is short. The external ears may be displaced caudally. The eyes are wide-set, and may show proptosis and corneal opacities. There is a depressed nasal bridge and frequently a chronic discharge. The lips and tongue are thick and the teeth widely separated and poorly formed. There may be flaring of the costal margins, blending into the rounded protuberant abdomen. Hepatosplenomegaly and an umbilical hernia are frequent. The kyphosis may be marked or absent. Flexion deformities of various joints are usually apparent, with more or less typical thick, broad, "claw" hands. Enlargement of the wrists is sometimes noted. There is impairment of the intelligence in most cases. This description of the clinical features may be found in various reference works on this disease.

Roentgen-ray studies of the skeleton reveal some or all of these abnormalities: (a) large misshapen skull with an elongated, shallow sella turcica; (b) thickened sternal ends of the clavicles; (c) kyphosis involving the twelfth dorsal, and first or second lumbar vertebrae; the anterosuperior portions of the vertebrae involved in the kyphosis may be destroyed, resulting in a hooklike projection from the anteroinferior portion; (d) lower ribs constricted at their necks and broad beyond, giving a "ribbonlike" appearance; (e) shallow glenoid and acetabular fossae; (f) heads of the humeri tilted medially; (g) shafts of humeri swollen with tapering toward their ends: (h) coxa valga deformity; (i) distal epiphyseal lines of radius and ulna tilted toward one another; (j) retardation of "bone age;" (k) metacarpals and phalanges broad, short, pointed, with widened medullary cavities and coarse trabeculations throughout.[4-6]

Routine laboratory and blood chemistry studies are usually within normal limits. However, a microcytic, hypochromic anemia may be present. Attention has been called to the presence of large granules and occasionally vacuoles in the cytoplasm of the polymorphonuclear leucocytes.[7] Hypercholesterolemia and impaired liver function have been reported.[8] Air ventriculography may show dilatation of ventricles; at least one electro-encephalogram was normal.[8]

The prognosis is poor and treatment is almost always ineffective.[1]

The disease is said to show no racial limitations and there have been reports in various nationalities. While no painstaking search of the literature was made, this is the first case, to our knowledge, to be reported in a Negro.

From the Department of Pediatrics, Baylor University College of Medicine, the Hermann Hospital, and the Junior League Children's Clinic.

Case Reports

IDIOPATHIC DILATATION OF THE COMMON BILE DUCT IN CHILDHOOD

WESTON M. KELSEY, M.D.
WINSTON-SALEM, N. C.

IDIOPATHIC dilatation of the common bile duct is rare. Seventy-one case reports have been found, of which only two articles are in the American pediatric literature.[1, 2] Many cases are reported in journals which are not available, such as forty-two cases reported from Japan. This condition has rarely been considered preoperatively. The frequency with which the condition is overlooked is probably a result of lack of publicity, as the symptoms and signs are typical.

CASE REPORT

B. F., a white female, aged 4 years, was admitted to the Pediatric Service of the North Carolina Baptist Hospital on Aug. 9, 1946.

Family History.—The father was killed in action, the mother was living, and there were no other siblings.

Present Illness.—The patient had an uneventful neonatal period without physiologic jaundice. At the age of 3 weeks, she had an episode of jaundice which lasted one week and subsided without therapy. She remained well until the age of 15 months, at which time there was an attack of vomiting and fever followed by marked jaundice. The urine became dark and the stools acholic. The patient's status remained unchanged for a period of eight months, at which time choline was given. Shortly after this the patient improved rapidly. This was reported in the literature as a cure of hepatitis with choline.[3] At the age of 26 months, jaundice developed again. From that time until the onset of the present attack, the patient had many minor illnesses with mild jaundice, dark urine, and light-colored stools. The last episode began two months prior to admission. During this period she complained of right upper abdominal pain for the first time. The jaundice, dark urine, and acholic stools persisted.

During these illnesses the patient had been seen elsewhere by three competent pediatricians, who felt she had recurrent hepatitis with cirrhosis. She was referred to the North Carolina Baptist Hospital for further study.

Physical Examination.—Revealed a well-developed and well-nourished child, who was not acutely ill. The temperature, pulse, respirations, and blood pressure were normal. The height was 42½ inches; weight, 37½ pounds. The skin and sclerae were markedly icteric. The abdomen was protuberant. The liver was palpable 8 cm. below the right costal margin. The spleen was palpable 2 cm. below the left costal margin. No tumor mass could be felt in the abdomen.

Laboratory Findings.—Urinalysis: bilirubin and bile were present, and urobilinogen was present in minimal amounts. Blood: 11 Gm. hemoglobin; red blood cells, 3,490,000; white blood cells, 7,350; polymorphonuclears, 58 per cent; lymphocytes, 40 per cent; eosinophiles, 2 per cent. Fragility test: hemolysis began at 0.40 per cent and ended at 0.32 per cent; control began at 0.46 per cent and ended at 0.38 per cent. Bilirubin was 11.5 mg. per cent. Serum cholesterol was 446 mg. per cent. Total serum proteins were 6 Gm. per cent. Stools were gray. Test for bile was weakly positive. Prothrombin time was 16.4 seconds. Control was 16.5 seconds.

From the Department of Pediatrics, Bowman Gray School of Medicine of Wake Forest College, and the North Carolina Baptist Hospital.

The general appearance was as shown in Fig. 1, a pot-bellied child with large head, grotesque facies, and dorsolumbar kyphosis. The fronto-occipital circumference was 51.5 cm., height 79 cm., weight 11.8 kg.; the center of the body was at the umbilicus. There was fine black hair over the shoulders. The nasal bridge was depressed and there was a profuse mucopurulent nasal discharge.



FIG. 1B.—Profile view showing characteristic clinical appearance.

The eyes were wide-set and with slight proptosis. There was milky-white opacity of both corneas with no vascular infiltration. Because of the patient's uncooperativeness the slit lamp was not used. It was the ophthalmologist's opinion that probably only the superficial portion of the cornea was involved. The lips were thick. Nine teeth were widely spaced and peg-shaped. The neck was short and held in slight extension. The ears were displaced caudally. The thoracic cage flared at the costal margins. The heart sounds were forceful, but no murmurs were heard. There was diastasis recti and a small umbilical hernia. The liver edge was firm and extended 6 cm. below the right costal margin. The spleen was not felt. There was limitation of abduction at both shoulders and of extension at the elbows and knees. The hands were held in slight palmar flexion and fingers were flexed, as shown in Fig. 1, *A*.

Laboratory data revealed a hypochromic microcytic anemia. No abnormal granules or vacuoles were seen in the cytoplasm of the polymorphonuclear leucocytes, as Reilly suggested.[7] No bone marrow studies were done. Examination of urine and stools was negative. Wassermann and tuberculin tests were nega-

IMPETIGO NEONATORUM CONGENITA

Five Cases in Siblings

Abraham Gilner, M.D., and Irving Nelson, M.D.
Brooklyn, N. Y.

THE congenital form of pemphigus neonatorum, or impetigo neonatorum congenita, is a rather rare condition. In 1908, Labardt and Wallart[1] reviewed thirteen cases going as far back as 1794, and added three cases of their own. Grosz[2] reported one case of his own, and recalled a similar case of Peters, in 1902. Since that time, only a few cases have been added to the literature. Reed[3] brought the attention of American dermatologists to the possibility of congenital pemphigus in 1928 when he reported eleven cases, nine of which he had personally observed. Freeman[4] reported two cases in 1931. Wise, in discussing Freeman's paper, stated that he had seen one case of congenital pemphigus. In 1934, Rucker[5] reported neonatal deaths in two siblings from impetigo neonatorum congenita. Weston[6] reported one fatal case in 1936, while Daniel and Ayer[7] observed another case with a similar termination in 1937. DeLee, in a personal communication to Daniel and Ayer, stated that up to July, 1936, he had known of only one case, in which a woman had delivered two babies, both born with pemphigus. This is the report of one of five cases in siblings, in all of whom a diagnosis of congenital pemphigus neonatorum was made.

CASE REPORT

Mrs. L., 34 years old, colored, a nonclinic patient, delivered spontaneously a 9-pound girl on Aug. 1, 1946. Immediately after delivery it was noticed that there was marked maceration of the infant's skin. Desquamation was most marked around the posterior portion of the neck, with extension around to the angles of the jaw. A small portion of the upper anterior chest, extensor surface of the right forearm, and, to a lesser extent, the palms and soles, were also involved. A few scattered milia were found on the lower jaw. Several vesicles about 2½ mm. in diameter were scattered on the left anterior chest and lower back. The palms and soles were free of any vesicles or bullae. No lesions could be found around the anus, in the mouth, or around the eyes. The cry, color, and respiration were good. Heart and lungs were normal, while the liver and spleen were not palpable.

Both mother and baby were immediately placed in isolation. A dark-field examination of the base of one of the vesicles was done the day of delivery and revealed no organisms. Fluid was aspirated the day following delivery from another vesicle and cultured. *Staphylococcus aureus* was grown. A blood culture taken the same day was sterile. A blood count revealed: hemoglobin, 112 per cent; red blood cells, 5,075,000 per cubic millimeter; differential—stab cells, 11 per cent; polymorphonuclears, 41 per cent; lymphocytes, 38 per cent; monocytes, 2 per cent; and eosinophiles, 8 per cent. The cord Wassermann and Kline were both negative. Another vesicle was aspirated on August 3, the fluid cultured, and *Staph. aureus* again grown out. A blood count done on August 21 showed: hemoglobin, 96 per cent; red blood cells, 4,760,000 per cubic millimeter; white blood cells, 12,000 per cubic millimeter; polymorphonuclears, 32 per cent; lymphocytes, 66 per cent; and eosinophiles, 2 per cent. An x-ray of the long bones, wrists, and ankles taken on August 1 was normal.

From the Service of Dr. J. Monfort, Department of Pediatrics, Cumberland Hospital, Brooklyn, T. B. Givan, M.D., Director of Service.



Fig. 3.—Broad, "ribbonlike" lower ribs are shown



Fig. 4.—A portion of the upper extremity showing the swollen shaft of the humerus and the medial tilting of its head

During 1937 and again in 1938 the mother had two spontaneous abortions at three months each. She was treated at a local hospital. Blood Wassermanns were negative both times.

Since 1938, the mother had been subject to repeated attacks of outcroppings of small blisters around her neck. Regardless of what remedy she would use, the blisters would eventually crust, dry, and disappear. These attacks had occurred with increasing frequency with each succeeding pregnancy. In addition, the attacks were also worse for a period of about four to five weeks following parturition. She had attended several skin clinics but had never been told what was wrong with her.

On Aug. 7, 1939, the patient delivered an 8-pound, 6-ounce male "apparently normal except for maceration of skin over fingers and toes and circinate erythematous skin lesions over the face with raised maculopapular margins and isolated vesicles, these being dark red, and the surrounding skin macerated." The cord Wassermann was negative as was the blood Wassermann done on March 16, 1941. X-ray of long bones on Jan. 15, 1940, was also negative. After discharge from the hospital, the baby was treated in the skin clinic for seborrhea of the scalp, which condition eventually cleared up.

Jan. 7, 1943, saw the birth of a girl at another local hospital. Irregular outlined bullae were present on the baby's body at birth. Small pustules were also present in the scalp. A smear taken from one of the pustules showed degenerated white cells and gram-positive diplococci. The blood Wassermann of the baby was negative while that of the mother was one plus. The infant was discharged with a diagnosis of impetigo neonatorum. The skin lesions eventually cleared up at about 2 months of age.

On March 5, 1944, the patient delivered a girl at the Cumberland Hospital. At about one week prior to delivery the mother had received one intravenous and one intramuscular injection at an antisyphilitic therapy clinic. At the time of delivery it was noticed that the baby's skin over the forehead was macerated and that many small vesicles could be found over the body. From the time of delivery up until the day the baby was discharged, March 28, 1944, the skin lesions went through the same stages of vesicle formation, drying, and residual hyperpigmentation as the previously mentioned cases. Two dark-field examinations of fluid from the vesicles, cord Wassermann, another blood Wassermann done at 4 weeks of age, and x-ray of long bones were all negative. *Staph. albus* and *aureus* were grown from the aspirated vesicle fluid.

Examination of the mother revealed "a diffuse skin lesion with eroded corium and shiny pearly gray base varying in size from 0.5 to 9 cm. in diameter beneath the breasts and in the inguinal and lower abdominal areas. Some have dried crusts on them." Diagnosis was intertrigo (dermatitis factitia).

A blood Wassermann of the mother was negative in May, 1945.

DISCUSSION

The congenital form of pemphigus neonatorum is, as a rule, a benign disease. It does not affect the general condition, and the vesicles or bullae disappear and heal within a few weeks, never to recur, and leaving no scars. The cases we reported followed this pattern very closely.

The problem of etiology remains to be solved. When the infants were delivered a tentative diagnosis of congenital syphilis was made in all five cases. Suspicion was especially high in the infant which had been born during the time the mother was receiving antisyphilitic therapy. The negative x-ray of long bones, negative dark-field examination, and persistently negative blood Wassermanns over a period of three years ruled out the possibility of congenital syphilis. These findings, in general, also held true in the other four cases.

deformities. It is his opinion that cerebrospinal fluid, escaping through a defect in the roof of the developing fourth ventricle, gives rise to the formation of "blebs" in the subcutis. If these blebs are not absorbed, the pressure resulting from their accumulation in various hollow parts of the embryonic surface (e.g., orbits, root of nose, blind sacs of limb buds) upsets the developing organs' balance and leads to deformities. A pituitary-hypothalamic derangement may also be due to similar increased pressure and so cause an upset in lipoid metabolism.

Whatever the etiology, the diagnosis in such typical cases as the one presented should not be difficult, but in less well defined instances other forms of retardation, dwarfism, and skeletal abnormalities must be considered, e.g., cretinism, rickets, syphilis, Morquio's disease, the lipoidoses. Excellent differential diagnoses are given elsewhere.[1, 5, 10-12]

SUMMARY

Lipochondrodystrophy is discussed and a case report in a negro child is included.

REFERENCES

1. Washington, J. A.: in Brennemann, J., Practice of Pediatrics. Hagerston, Md., 1942, W. F. Prior Co., Lipochondrodystrophy, vol. 4, ch. 30.
2. Hurler, G.: Ueber einen Typ multipler Abartungen, vorwiegend am Skelettsystem, Ztschr. f. Kinderh. 24: 220, 1920.
3. Ellis, R. W. B., Sheldon, W., and Capon, N. B.: Gargoylism (chondro-osteo-dystrophy, corneal opacities, hepatosplenomegaly, and mental deficiency), Quart. J. Med. 5: 119, 1936.
4. Larson, S., and Lichty, J. A., Jr.: Gargoylism, Report of Three Probable Cases, Am. J. Roentgenol. 50: 61, 1943.
5. Harvey, R. M.: Hurler-Pfaundler Syndrome (Gargoylism); Review of the Literature With Report of an Additional Case, Am. J. Roentgenol. 48: 732, 1942.
6. Caffey, J.: Pediatric X-ray Diagnosis, Chicago, 1945, The Year Book Publishers, p. 631.
7. Reilly, W. A.: The Granules in the Leukocytes in Gargoylism, Am. J. Dis. Child. 62: 489, 1942.
8. Lurie, L. A., and Levy, S.: Gargoylism. Review of Literature With Report of Two Cases, Am. J. M. Sc. 207: 184, 1944.
9. Hogan, M. J., and Cordes, F. C.: Lipochondrodystrophy (Dysostosis Multiplex; Hurler's Disease); Pathologic Changes in the Cornea in Three Cases, Arch. Ophth. 32: 287. 1944.
10. Kressler, R. J., and Aegerter, E. E.: Hurler's Syndrome (Gargoylism); Summary of the Literature and a Report of a Case With Autopsy Findings, J. PEDIAT. 12: 579, 1938.
11. Sear, H. R., and Maddox, J. K.: A Case of Hurler's Disease (Lipochondrodystrophy), M. J. Australia 1: 488, 1945.
12. Engel, D.: Etiology of Multiple Deformities, Am. J. Dis. Child. 60: 562, 1940.

CONGENITAL DESMOID OF THE ABDOMINAL WALL

DAVID DEAN BROCKMAN, M.D.
DURHAM, N. C.

DESMOIDS are among the less commonly occurring connective tissue tumors; the congenital desmoid is extremely rare. Pack and Ehrlich[1] reported an incidence of 0.03 per cent in their series from the Memorial Hospital. In 4,660 autopsies at Duke Hospital two instances of this neoplasm were found, or 0.043 per cent. In the surgical pathologic series of 114,778 specimens, ten cases, or 0.0087 per cent, were indexed. The case reported in this paper represents the only congenital desmoid in either series.

Pfeiffer[2] (1904) collected eight cases of childhood desmoid of the abdominal wall at the Bruns Clinic, two of which are definitely congenital, one of them having been described previously (1896) by Kramer.[3] The ninth case was reported by Sujoy and Maggi.[4] Grieg[5] (1915) described what he thought to be a congenital desmoid, but the tumor was first noted at the age of 8 months. The following is believed to represent the third unquestionable congenital desmoid of the abdominal wall to be described.

REPORT OF CASE

The patient was a 4-week-old Negro female infant born without complication following full-term gestation. At birth a midline tumor was noted extending from the pubis to within one centimeter of the umbilicus; the skin at one point over the mass was ulcerated and bled somewhat for several days. Despite the presence of the tumor, the infant gained weight and grew at a normal rate. The family history contained no pertinent information. The physical examination was negative except for the discovery of the tumor. This measured 15 × 8 cm.; it was solid, irregular in outline, firm, symmetrically disposed, fixed to the underlying tissues in the midline, attached to the overlying skin, and did not transmit light or emit peristaltic sounds. It extended from the mons veneris to 1 cm. below the umbilicus. The skin overlying the most prominent portion was thin, dry, discolored, and at one point there was an ulcer 2 cm. in diameter. Distally, the mass impinged upon the labia majora. The urethral meatus was found at the inferior pole of the tumor.

Laboratory studies of blood and urine revealed no abnormal findings. Roentgenograms showed the tumor to be of uniform density and not connected with adjacent bony structures. The hospital course was uneventful until surgical removal of the tumor was undertaken. The tumor was found to infiltrate the rectus muscles and their sheaths, but did not extend to the peritoneum. It was removed, but the patient did not survive the necessarily extensive operative procedure.

Autopsy (19 Hours After Death).—There was a T-shaped midline, sutured, surgical incision below the umbilicus. The longitudinal arm was 5 cm., and the suprapubic transverse arm 7 cm. long. The external genitalia exhibited moderate edema. The remainder of the postmortem examination was without abnormal findings.

The surgical specimen measured approximately 20 × 8 × 4 cm.; the cut surfaces were smooth, firm, trabeculated, white, and glistening. The skin was intimately adherent to the tumor, and the rectus sheaths blended imperceptibly with the neoplasm. The rectus muscles were replaced except at the superior pole of the tumor. No definite capsule could be made out.

Microscopically the neoplasm was found to be very cellular. Near the center of the mass the cells were identical with adult fibrocytes. The elongated cells formed strands and bundles which interlaced in all directions after the manner of the common uterine fibromyoma. Extension of the neoplastic cells was found well into the corium of the overlying skin. At the periphery of the tumor

From the Department of Pathology, Duke University School of Medicine.

The Social Aspects of Medicine

I wonder how many readers of the Column are aware that the Canadian Medical Association recommended compulsory health insurance to the Canadian House of Commons as far back as 1943. It is extraordinary that this important act on the part of organized medicine in our close neighbor should not have had the prominence which is its due in the medical periodicals, in particular in the *Journal of the American Medical Association,* since what organized medicine does in Canada should be of vital interest to organized medicine in the United States. The "Submission" by the Canadian Medical Association is too long to be given in the Column in its entirety. The parts which I have deleted are, however, the least important to us. Whatever is given is exactly as the text stands in the original.

What the Canadian Medical Association does is of great moment to pediatricians, for is not Canada a vast country of Anglo-Saxon heritage faced with essentially the same medical care problems as ourselves, and is not Organized Medicine in Canada composed of the same kind of doctors as organized medicine in this country? Why then should they think so differently from us?

E. A. P.

A SUBMISSION RESPECTING HEALTH INSURANCE*

Presented to the Special Committee on Social Security of the House of Commons

BY THE CANADIAN MEDICAL ASSOCIATION, APRIL, 1943

Mr. Chairman, Ladies and Gentlemen:

The Canadian Medical Association welcomes this opportunity of appearing before the Special Committee on Social Security to discuss the problem of Health Insurance.

In respect to great national problems such as Health Insurance, The Canadian Medical Association has not been content in the other provinces to canvass its members only. On the contrary, the medical profession of Canada as a whole has been invited to make its voice heard in respect to these broad questions, to the end that it can be said without fear of contradiction, that the representations which The Canadian Medical Association now makes to the Parliamentary Select Committee express the considered views of the medical profession as a whole throughout the Dominion.

PURPOSE OF SUBMISSION

1. To emphasize that adequate medical care is essential to the welfare of Canada;
2. To review certain factors which handicap the medical profession in providing adequate medical care;
3. To point out that highly desirable, preventive and public health services are now inadequate;
4. To indicate the position of The Canadian Medical Association with respect to State Health Insurance;

From the Secretarial Offices of the Canadian Medical Association, 184 College Street, Toronto, Ont.

*Reprinted by permission of the Canadian Medical Association.

fibroblast-like cells infiltrated the skeletal muscle. The cytoplasm of the skeletal muscle fibers in small areas were found to be undergoing degenerative changes. Multinucleated giant cells with peripheral or polar nuclei were present. Special stains for fibrous tissue, neurofibrils, myelin, and reticulum merely confirmed the fibrous nature of the tumor.

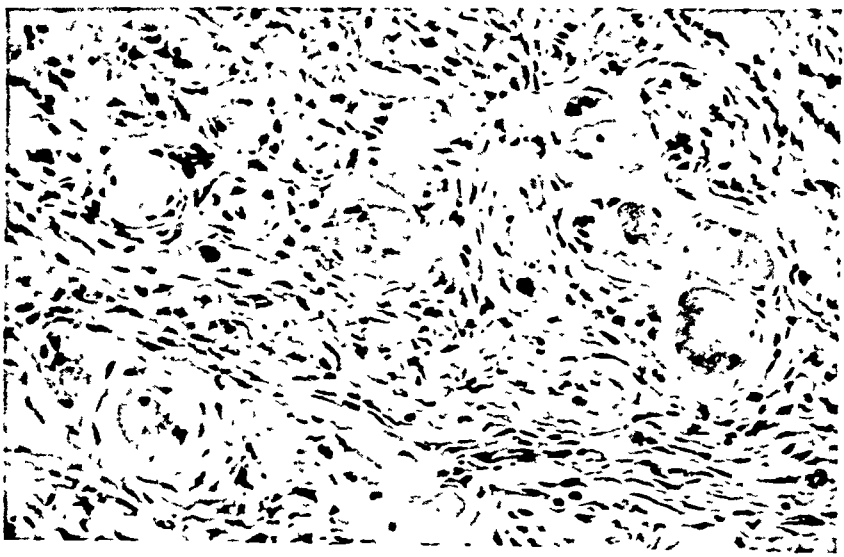


Fig. 3.—Photomicrograph showing the formation of multinucleated masses from degenerating striated muscle. (×250.)

COMMENT

Since the first description of the desmoid tumor by MacFarlene[6] (1832) numerous ideas have been advanced as having etiologic significance; among these are pregnancy, trauma, and operation scars. Geschickter,[7] investigating the hormonal influence in desmoids, has recovered 13,000 units per kilogram of gonadotropic hormone by bio-assay. No estrin was obtained. None of these ideas has clarified the congenital desmoid, which unquestionably arises at a relatively early embryonic age. Of the several cases of this tumor reported in children, all but two were discovered two months to two years postnatally. It is more logical to reserve the term "congenital" desmoid for those instances in which the tumor was noted at birth.

The attendant difficulties and dangers of surgical and obstetrical management of the congenital desmoid are apparent.

SUMMARY

A case is presented which constitutes the third reported unequivocal instance of the congenital desmoid, i.e., discovered at birth. Ten cases of abdominal wall desmoid in infants and children have been recorded in the literature, only two of which were noted at birth. The morphologic and histologic characteristics are reviewed.

REFERENCES

1. Pack, G. T., and Ehrlich, H. E.: Internat. Abst. Surg. 79: 177, 1944.
2. Pfeiffer, C.: Bruns' Beitr. z. klin. Chir. 44: 334, 1904.
3. Kramer, W.: Arch. f. klin. Chir. 52: 34, 1896.
4. Sujoy, E., and Maggi, R.: Semana med. 1: 247, Feb. 5, 1942.
5. Grieg, D. M.: Edinburgh M. J. 15: 345, 1915.
6. MacFarlene, J.: Clinical reports of the surgical practice of the Glasgow Royal Infirmary, Glasgow, 1832, D. Robertson, p. 63.
7. Geschickter, C. F., and Lewis, D.: Am. J. Cancer 25: 630, 1935.

Medicine has ceased to be a science in which any one man can expect to be able to offer full service. For special diagnosis or for certain curative measures, individuals with special knowledge in selected fields must be called in. This has increased accuracy of diagnosis and efficiency of treatment but has added to the cost.

True, it could be pointed out that the results attained have more than compensated for additional costs. Better and earlier diagnosis and more effective treatment have shortened illnesses and saved lives beyond computation. Actually, despite increased costs of hospitalization, certain specific illnesses, such as pneumonia, gall bladder operations, etc., cost the patient less for hospitalization today than at the turn of the century, due to a greatly reduced period of hospitalization. Moreover, costs of medical care have not risen as rapidly over the years as has the general cost of living. Nevertheless, owing to the unpredictability of most illnesses and accidents and the reluctance or inability of most people to budget for illness, some means is necessary of relieving the individual of the burden of the cost of illness at the time when he can least afford to pay these costs.

The section of the community which has suffered most from the increase in cost is the great mass of honest thrifty folk of moderate means. The so-called "indigent" has usually received the medical care he has needed and illness has seldom created a grave financial problem for the well-to-do. But for the man of low or moderate income who desires to pay his way, the possible costs have definitely deterred him in many cases from seeking early advice or agreeing to the proper treatment.

Voluntary medical and hospitalization plans.—In an effort to alleviate the financial burden of sickness, a number of voluntary medical and/or hospitalization plans have been set up. The better hospitalization plans are known as "Blue Cross Plans." These voluntary contributory plans for medical care, or hospitalization, have been of much assistance to their members when overtaken by illness. Unfortunately there are many areas where these plans do not operate; also, being of a voluntary nature they do not cover all of the employed people of moderate means. Moreover, they seldom provide a complete service nor do they make provision for those who are unable to make any contribution.

(b) The distribution of medical services in the various parts of Canada, urban and rural, is not as it should be if all of our people are to receive full and adequate medical care.

This applies also to health services in general.

A major problem in medical distribution is that of providing adequate medical care in rural districts. Present wartime conditions are abnormal and, therefore, cannot be taken as a basis of discussion, but long before the war it was obvious that there was a heavy concentration of medical practitioners and of health services in general in the urban areas. Now with large numbers of rural doctors in the armed forces, the problem is much more acute.

This situation not only makes active treatment difficult to obtain, but it interferes with preventive services. For years infant mortality has been much higher in rural than in urban areas; the same applies to tuberculosis.

Some Concentration in Cities Logical

It should be pointed out, however, that, under any system, some concentration of medical personnel must be expected. Specialists could not be located other than in centres large enough to afford them an adequate clientèle; although located in centres, they serve both rural and urban patients. As the more technical or specialized diagnostic and curative procedures can best be done in hospitals, patients must continue to be taken to hospital for such purpose. Frequently the equipment or skilled personnel is only available in large urban

CASE REPORT

P. A. L., Negro, female, was breech-born at full term after a normal labor, and weighed 2,700 Gm. No abnormalities were noted at birth. The parents were said to have been healthy and were unrelated. There was no history of similar disease in relatives.

The patient sat alone at 8 months, cut her first teeth at 12 months, and was able to "pull-up" at 19 months. The words "mama" and "daddy" were first spoken at 17 months.



Fig. 1A.—Front view showing characteristic clinical appearance. Note the claw hand.

Soon after birth "noisy" respirations and a watery nasal discharge were noted. A "lump in the back" was first noted at about 1 year, and haziness of the eyes at about 2 years. There was always fecal and urinary incontinence. Hearing seemed unimpaired.

At the age of 19 months the diagnoses of rickets, scurvy, and anemia were made, for which the patient received the appropriate vitamins and a blood transfusion.

One year later, i.e., at the age of 2 years, 7 months, she was admitted to the Hermann Hospital for diagnostic studies. At the time the patient could sit alone, crawl, pull up to a standing position but not walk. She was quite irritable and resisted examination vehemently. Speech was limited to the words "mama" and "daddy."

Principle of Health Insurance Approved

At a largely attended special meeting of the Council of The Canadian Medical Association held in Ottawa, January 18th and 19th, 1943, the subject of Health Insurance was again considered. Previously the Council had said that if Health Insurance were to be established in Canada it should be along certain lines, but had refrained from recommending it or opposing it. At this time, and for the first time, the Council went farther. In Ottawa in January, 1943, the Council endorsed the principle by passing the following resolution:

WHEREAS the objects of The Canadian Medical Association are:

1. The promotion of health and the prevention of disease;
2. The improvement of health services;
3. The performance of such other lawful things as are incidental or conducive to the welfare of the public; and

WHEREAS The Canadian Medical Association is keenly conscious of the desirability of providing adequate health services to all the people of Canada; and

WHEREAS The Canadian Medical Association has for many years been studying plans for the securing of such health services;

THEREFORE BE IT RESOLVED THAT

1. The Canadian Medical Association approves the adoption of the principle of Health Insurance.
2. The Canadian Medical Association favours a plan of Health Insurance which will secure the development and provision of the highest standard of health services, preventive and curative, if such plan be fair both to the insured and to all those rendering the services.

V. FEATURES WHICH SHOULD BE INCLUDED IN ANY PLAN OF HEALTH INSURANCE

We visualize for Canada a system of Health Insurance which will be more all-inclusive, efficient and sound than any which has ever been devised and operated anywhere. It should place much emphasis on the prevention of disease and the development of a high degree of physical fitness, and should also include complete modern diagnostic and curative services. Possibly this full program cannot be immediately instituted in its entirety, because of shortage of trained personnel and of institutions, and possibly because of cost, but the full service should be visualized and planned. Medical knowledge in the prevention and cure of disease is far ahead of the means for its general utilization by the public.

It is obvious, too, that any plan of Health Insurance which is not supplemented by a program to ensure better nutrition, better housing and the reduction of worry and anxiety, particularly for those of low and uncertain income, will fail of its objective.

A. Adequate Preventive and Public Health Provision

1. Reorganization of public health and preventive services is necessary to *place more responsibility for various procedures on the family practitioners.* Their services must be available for and integrated with the public health officials' program. The family must be the unit and the family doctor the first line of defence in this program;

2. Our rapidly expanding knowledge of *nutrition* should be translated into action—adequate diets should be available to all. This implies not only a vigorous educational program but also a degree of economic security to which reference has previously been made

3. The present knowledge of the value of *inoculations, vaccinations and other immunizing and diagnostic procedures* in the control and eradication of

tive. Blood cholesterol was slightly elevated (278 mg. per cent). X-rays of the skeleton revealed almost all of the previously listed abnormalities, as depicted in Figs. 2 to 6. The skull is not shown, but it did reveal symmetrical enlargement with a suggestion of elongation of the sella turcica. The bone age was not retarded and the sternal ends of the clavicles were not abnormal.

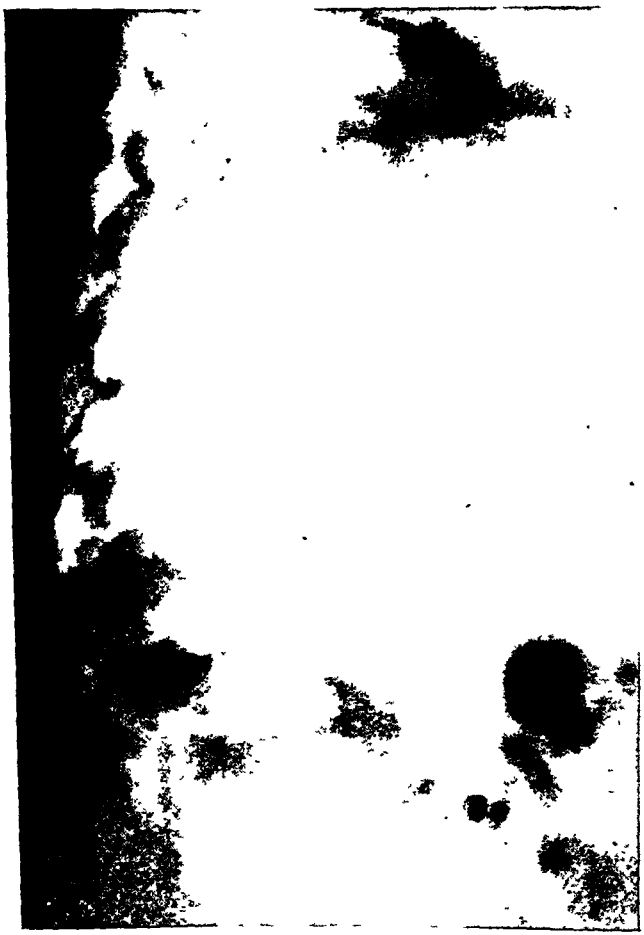


Fig. 2.—Kyphosis and a hooklike projection from the anteroinferior portion of second lumbar vertebra are shown.

DISCUSSION

From the foregoing review and case report it is obvious that a combination of seemingly unassociated features is present in this disease. It is this fact which makes for confusion so far as the etiology is concerned.

Some contend that a defective germ plasm accounts for the disturbance in endochondral growth; the nonskeletal features are said to result from a deranged lipoid metabolism, causing this disease to be classified as the "fifth lipoidosis" along with Niemann-Pick, Tay-Sachs, Hand-Schuller-Christian, and Gaucher's diseases. It is stated that pathologic studies substantiate this argument.[9-11]

Engel[12] applying the works of Bagg and of Bonnevie, has proposed a very interesting theory of the etiology of this and related diseases showing multiple

necessary, diagnostic facilities should be set up to serve designated areas. In some cases the pooling or centralizing of some of these diagnostic services could reduce overhead and consequent cost.

All necessary diagnostic aids which have been proven to be of scientific value should be available for all the people.

E. Hospitalization

Hospitalization accommodation should be available to all who need it and for such time as they need it.

F. Nursing

A visiting nurse service should be available in the home on the order of the medical adviser. Full time nursing service should be made available upon the authorization of the regional medical adviser.

G. Drugs and Appliances

Drugs and pharmaceutical preparations, as authorized in an official formulary which could be prepared, should be available upon the order of the medical adviser. Appliances, such as spectacles, crutches, artificial legs, etc., should be available within reason when authorized.

H. Dental Services

Dental prophylaxis and care with a stipulated limit should be available to all.

I. Problems Needing Special Attention

There is considerable need for the development of adequate facilities for the rehabilitation of those partially incapacitated by physical and mental illness. Such a program would be both humanitarian and economically sound.

There is need, too, in every province in Canada for more homes for the care of the aged and the infirm.

This also applies to the care of those who are chronically ill.

VI. WEAKNESSES OBSERVED IN PLANS OF HEALTH INSURANCE ELSEWHERE SHOULD BE AVOIDED

In the setting up of any Health Insurance measure in Canada, it is highly desirable that we profit by the experiences of other countries. Their Health Insurance enactments have been studied carefully by our Association. To obtain first hand information, The Canadian Medical Association sent its General Secretary to Europe in 1937 to study Health Insurance in operation.

The following weaknesses and omissions observed there and elsewhere should be avoided in Canada:

(a) Limited range of service in some countries

A plan which provides for general practitioner service only does not provide a complete service. Such arrangement is not fair either to the patient or to those who must render specialist service.

By not providing for hospitalization, patients are either unable to obtain needed hospitalization, or must bear heavy financial burdens, or must accept charity. All too frequently an insurance scheme thus becomes a charity scheme.

(b) Dependents not covered in some plans

To omit from benefits the dependents of the insured, still requires the breadwinner to finance the major portion of sickness in the average family (somewhat over two-thirds of the total hospitalized illness in a family with two children and a still higher proportion—nearly four-fifths—in the case of home and office practice).

(c) "Indigents" not covered in some countries



Fig 5.—Coxa valga deformity is shown

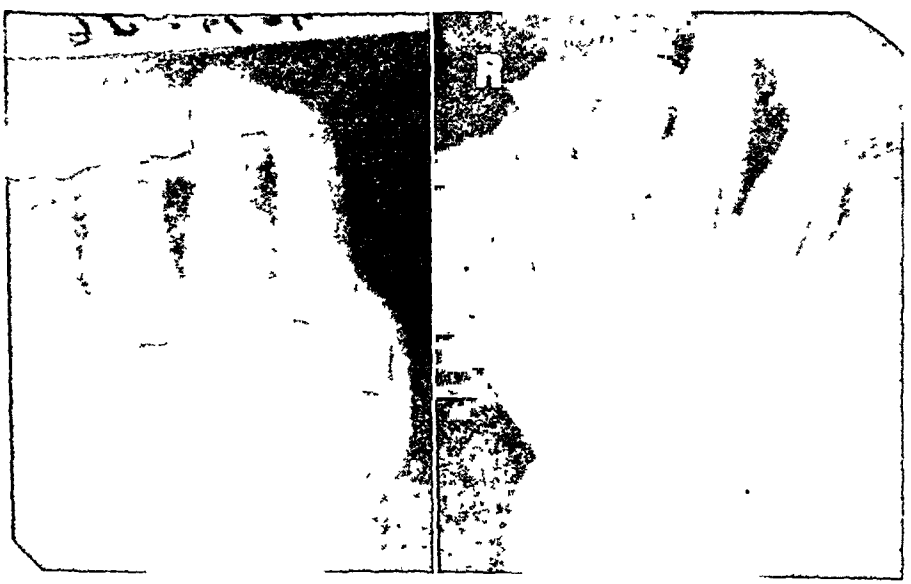


Fig 6.—Note the characteristic deformities of metacarpals and phalanges, also shown is the tilting of the ends of radius and ulna toward one another.

or higher than has been available in the past, and will be fair both to the person insured and to those rendering the services.

(b) Should Health Insurance be a strictly federal measure or should it be a provincial measure, operating under federal enabling legislation and with federal assistance?

We realize that there are advantages in a single nation wide measure of Health Insurance. It does appear, however, that there are certain factors which would indicate that Health Insurance should be introduced on a provincial basis. Provincial plans should be co-ordinated by federal legislation of an enabling nature. Such federal legislation should outline those standards to which provincial enactments would be expected to conform in order to receive federal subsidies. Our reasons are as follows:

1. Local conditions, such as costs of living, needs for and costs of services, incomes, etc., vary in different provinces.
2. Some degree of variation and experimentation in detail is not without value.
3. It would be much more difficult to draft a federal measure acceptable in detail to all parts of Canada, than to prepare a federal measure which would outline the general provisions only and leave many of the details to be determined in the individual province.
4. By maintaining uniformity in the general structure of the plans to be developed in the different provinces, the problems of later unification, should that prove desirable, would be simplified.
5. Revision of the British North America Act would not be necessary.

Some Form of Federal Control Essential for Uniformity

If Provincial autonomy is to be maintained as suggested above, it is extremely important that a sufficient degree of federal control be retained. This control should be limited to such matters as the extent and the standards of the services, as indicated previously. It is important, however, that control be maintained as it is only through this means that a satisfactory degree of uniformity can be obtained. Unless there is considerable similarity in methods and program in matters of disease prevention and control, the results from the national viewpoint will be jeopardized.

(c) Administration.

Federal. If it eventuate that the federal legislation passed be of an enabling nature, it would follow that the function of the federal government with respect to provincial enactments would be broadly to supervise the operations of these provincial acts in order to determine the eligibility of the provinces to receive the federal subsidies and other assistance provided under the Act.

On this basis it is recommended that the federal administration be under the Minister of National Health, with an Advisory Dominion Council on Health Insurance.

If federal administration is to be carried out within the Department of Pensions and National Health it should be under a Health Insurance Division, with a Director in charge.

Provincial. In the provinces it is strongly recommended that the plan come under a *non-political independent commission* which might be responsible to the legislature through the Provincial Minister of Health. Because of the vital nature of health care The Canadian Medical Association considers it highly desirable to remove these important health services from the possibility of interference in the continuity of services or personnel by the vicissitudes of political change.

We believe, moreover, that the Commission should be so constituted, appointed and empowered that it will possess ample freedom of action and that its

HERNIATED OVARY IN AN INFANT

NORMAN DUREN, M.D., F.A.C.S., AND S. ROSA FRANK, M.D.
BEAUMONT, TEXAS

HERNIATION of an ovary into the inguinal canal is an unusual finding. M. Ferro and Y. Ferro reported a similar case of "Congenital Inguinal Hernia of the Ovary," in 1910.* A review of the varying symptomatology is given in that paper.

CASE REPORT

Baby C., a 4-week-old girl infant, was referred by her attending pediatrician, Dr. Frank. The infant's mother discovered a swelling in the left groin the day before admission to the hospital. The infant had appeared to be in pain. She cried frequently and took her formula poorly. Bowel movements had been somewhat loose and flecked with blood and mucus. There had been no vomiting.

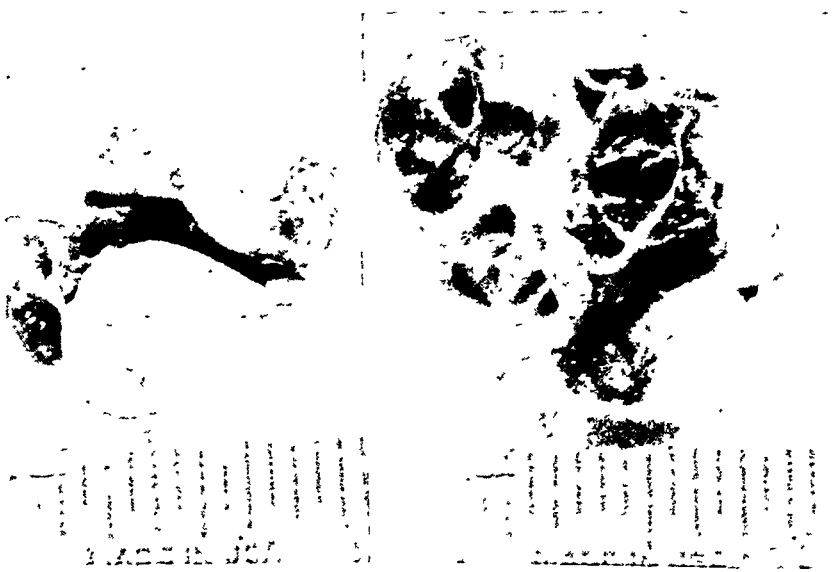


Fig. 1.—A, Ovary and overlying tube; B, ovary sectioned, showing cysts.

The infant did not appear acutely ill, although restlessness and discomfort were apparent. Abdominal distention was not marked. Digital examination of the rectum released gas and liquid stool. The tender mass in the left inguinal region was firm, movable, and about the size of a pecan. It was situated above Poupart's ligament near the upper end of the labial fold. It was irreducible. A scout film of the abdomen was negative. The blood count was normal. A preoperative diagnosis of herniated ovary was tentatively made.

Operative exposure under local anesthesia revealed a congested, edematous ovary and tube lying in hernial sac. The ovary and tube were ligated, excised, and the canal closed. Pathological examination of the specimen showed a congested cystic ovary. Postoperative recovery was rapid.

*Ferro Y., Ferro, M.: Congenital Inguinal Hernia of the Ovary, Med. de los ninos, 11: 17-20, 1910.

Insurance plan in which there would be no longer any group of individuals who would receive so-called "free treatment," there is a possibility that opportunities for clinical teaching may be reduced. While it is anticipated that the long recognized excellence of the quality of diagnosis and treatment in teaching hospitals may alone suffice to ensure a sufficient number of patients, it must be recognized that it is distinctly in the public interest that the popularity of teaching hospitals should be maintained, to the end that teaching may not be curtailed.

(i) The Plan should be on an obligatory basis for the income groups specified and should be without exceptions.

In other words all persons coming within the income brackets stipulated should be required to contribute to the Fund and be eligible for benefits and there should be no provision for the exclusion of groups below the income level set for the operation of the Act.

Much of the value of a fully adequate scheme lies in its *preventive* services. The entire population benefits from the functioning of these services and should contribute to them. Conversely, if preventive measures are not applicable to any groups in a community, not only do these groups suffer, but they may constitute a health menace to others.

There are certain plans operating in parts of Canada with voluntary prepayment for health services, providing either medical care or hospital care, or both. Some of these plans are excellent, as far as they go. But none of these plans, to the best of our knowledge, offer the complete protection, preventive, diagnostic and curative, which we believe in envisioned in this proposal. Some of these plans do not cover dependents. Others cover dependents but, in one-industry towns, may not cover the scattered townspeopls not directly connected with the plant. Any acceptable national or provincial plan should offer more than can any individual plan. These plans deserve great credit for their pioneering service but it is in the national interest to have all single plans amalgamated. With a government subsidy, the resultant cost to these industries should be less than under present conditions.

It has been the experience in other countries, notably Great Britain, that the exclusion of certain groups of individuals and the utilization of existing plans has complicated the situation and made it more difficult to attain ideal results. From the viewpoint of administration, a multiplicity of local arrangements, perhaps overlapping in the one community creates a situation so chaotic that efficient operation becomes very difficult [see page 18, par. (d)]. Another difficulty arises when an individual changes his employment or moves to another town. If Canada is to have Health Insurance, let its action be not hamstrung by lack of vision or courage.

There are within Canada, also certain groups who do not accept medical services—at least at times. They all, however, have been the beneficiaries of preventive and public health services and most of them, sooner or later, of diagnostic and treatment procedures as well. Apart from this, however, all our citizens have a *common community obligation*. There is probably no argument which can be advanced in support of the exclusion of certain groups from participation in any Plan which was not advanced two or three generations ago in opposition to the inclusion of the general population in a scheme under which all were taxed to support our great Public School system, even though all do not avail themselves equally of its privileges. It should be quite proper, of course, for certain individuals, if they so desire, to obtain their health care outside of the provisions of any insurance scheme, even as individuals now use schools which are apart from those provided under the authority of our Public or Separate School Acts.

5. To set forth features which should be included in any Plan of Health Insurance;

6. To point out the desirability of avoiding certain weaknesses observed in Plans of Health Insurance in other countries;

7. To make general comments with respect to a number of features to be considered in setting up any Plan of Health Insurance;

8. To show that Health Insurance can suffice to meet the medical needs of sparsely settled communities;

9. To discuss possible future developments in the years to come in the provision of good health care.

I. ADEQUATE MEDICAL CARE ESSENTIAL

It is most essential to the welfare of our people that the medical care provided be not only of the highest standard but be readily available to all. Although our present system of providing medical care is characterized by many desirable features worthy of retention, it is recognized that there are a number of ways in which provision is not made for the full needs of the people at the present time.

To achieve its full destiny Canada must have healthy citizens. Our people can only enjoy full and vigorous health if there be provided for them adequate facilities for medical care (preventive and curative) of the highest standard, which will be readily available to all, irrespective of geographic location and financial status.

It would appear that certain changes are necessary, and to achieve this result the medical profession stands ready to cooperate, for the welfare of the people has always been its primary objective. At the same time the medical profession is proud of the achievements of those who have laid the foundations of medical practice over the centuries. The medical profession has served the people well—caring for the poor, placing patient before self whether it be in time of plague or battle, developing medicine from discovery to discovery, fostering research, preserving what is perhaps the highest code of ethics in the world and attracting to its ranks many of the keenest minds of each generation. It is in the interests of our people that these features of medical practice be preserved.

II. HANDICAPS OR WEAKNESSES OF THE PRESENT SYSTEM

(a) The costs of sickness have become an increasing burden to many people, particularly those of moderate income, and have frequently prevented them from taking proper advantage of early diagnosis and treatment.

The extent and value and accuracy of medical knowledge and skill have increased tremendously, but at the same time the *cost* of this service has also become an increasing burden. The major increase has been due to the increasing complexity and delicacy of diagnostic methods and to the increased utilization of intricate apparatus and highly skilled personnel in treatment.

The diagnostic and "laboratory" equipment of Confederation days was limited to a stethoscope and (sometimes, not always) a thermometer. This equipment was the forerunner of the elaborate, complicated and costly, but highly accurate, equipment of our x-ray, pathological, biochemical and other laboratories. The number of hospital beds in Canada has increased from about 400 at the time of Confederation to over 100,000 at the present time. The investment in Canada is of some $250,000,000. In five or six decades the cost of providing hospital service which would be abreast of expanding medical knowledge has gone up from 75 cents per patient per day to an average of around $3.00 per patient per day. The cost of medical education has increased five or six fold and the time required has been more than doubled.

around waiting for a handful of scattered settlers to call for his services, but it does mean that methods will be worked out whereby "positive" health care can be made available to these people. This can be accomplished by adequate district nursing, by a reasonable system of rural hospitals and by providing doctors with sufficient returns to compensate them for the hardships and strain of that type of practice. This will all be made easier by providing good roads and improved methods of transportation.

As for *specialist* and *consultant services,* there is no reason why such cannot be made available to rural areas. To a large degree the removal of the economic barrier and better transportation will permit readier consultation at the doctor's office. The bigger problem—that of bringing the specialist or consultant to the rural patient—could, and may be, overcome in a fashion similar to that evolved some years ago in Australia and now widely utilized in military medicine, that is, by *aerial transport.* The day may not be far distant when health service planes could be made available in selected areas to carry specialists and consultants, or even "surgical teams," to seriously sick or injured patients. The same planes could function as "aerial ambulances" to carry patients to hospital. The helicopter type of plane would be particularly valuable for this purpose.

Health Centres

In certain areas, we can foresee the creation of "Health Centres" such as have been envisioned by the British Medical Planning Commission in its constructive report in 1942. In essence the proposal is as follows:

The Health Centre would be a building providing a series of consulting rooms, waiting rooms, a small operating room for minor surgery, laboratories and other accommodation. The general practitioners in the town, or that part of a city, would use these facilities for their office consultations. They would not be in partnership, as in a clinic, but would merely use these facilities in a co-operative manner. Each doctor would have his own patients who in turn have exercised their right to select their own medical adviser. Specialists would see patients either in the centre or elsewhere. Serious or more difficult cases would be sent to the hospital. Work of the centre would be preventive and educational, as well as diagnostic and curative.

The x-ray department and the laboratories would be available to all participating doctors: so would the dispensary, the secretarial department and the clinical records department. Health visitors and district nurses would have their headquarters at the centre.

A large city might have a number of these centres. We might add that where a hospital is centrally located it would be quite possible to have such office building adjacent to or part of the hospital itself.

Hospitals

Our present hospital system is excellent, but it will probably show better integration in the years to come. We sincerely hope that we shall always continue to benefit from the services of the great group of voluntary hospitals, lay and religious, which have served our sick for many years. It should be possible, however, without jeopardizing this system, to have hospital construction and equipment in general follow a carefully planned program based upon provincial and community needs rather than upon unrelated and sometimes overlapping local efforts.

Specially designed hospitals should be available in rural areas. These should not be made more elaborate than is justified by local needs, by professional and technical staff available and by the proximity or otherwise of similar or better facilities. Nor should they be more numerous than is necessary to meet local

hospitals. As it is neither possible nor advisable to set up fully equipped and staffed hospitals in all rural communities, many rural patients will continue to be treated in the larger centres, irrespective of any plan which may be put into effect.

Moreover, it has long been noted that many patients in rural areas, even though a competent physician be available in the community, will drive beyond him to the city for diagnosis or treatment. Resulting from the advent of the motor car and good roads, many doctors formerly able to make a living in a country community have been forced to move to larger centres.

Board statements to the effect that a large number of rural municipalities are without medical care may convey an erroneous impression. A township or a municipality may not have a resident doctor, yet just beyond the borders of that area might be located several doctors serving the district in question with fully adequate care. Motor cars, improved highways and telephones have completely changed the former conception of what constitutes the geographic area for a normal rural practice.

(c) Many communities have failed to organize themselves in such a manner as to make the best use of existing legislation or to initiate their own health services.

Many communities have failed for various reasons to organize themselves to take full advantage of existing legislation which would permit them to develop much needed health services. For instance, in rural areas with inadequate voluntary non-profit hospitals, more municipal or "union" hospitals would have greatly improved health services. For various reasons, among which might be cited economic conditions, lack of understanding and leadership, and even indifference, the public health services in many areas have often been but nominal, or even entirely absent.

III. PREVENTIVE SERVICES INADEQUATE

The present program of preventive medicine in the country is far from adequate. Our major emphasis in the past has been on the cure of disease—on *negative* health, as it were. There should be more emphasis in the future on *positive* health, on preventive medicine and public health. It is less costly to prevent disease than cure it, yet our progress in this direction, although steady and gratifying, has been far too slow.

In making these statements there is no implication in the slightest that the provincial, federal and municipal departments of health have not done excellent work. Actually they have accomplished much, frequently under considerable handicap. But the results have been much less than could have been achieved had adequate funds been available. It is unfortunate that, while, in the past, money has been freely available for so many other purposes, yet so much difficulty has been encountered in obtaining adequate funds for effective programs of preventive work and public education on health matters.

Health Insurance

IV. THE POSITION OF THE CANADIAN MEDICAL ASSOCIATION WITH RESPECT TO HEALTH INSURANCE

Realizing the situation, as already set forth, and that solutions for these difficulties must be found, The Canadian Medical Association has been actively studying the subject of Health Insurance for nearly fifteen years. In 1934 an outline of a possible plan of Health Insurance was drawn up and adopted by the Council of the Association. Studies continued and the principles upon which this outline was based have been reviewed and altered, or re-affirmed, from time to time up to and including the annual meeting of The Association in June, 1942.

Report of Meeting

THE FIFTH INTERNATIONAL CONGRESS OF PEDIATRICS

Despite four hot and humid July days in New York City, the meeting of the Fifth International Congress of Pediatrics at the Waldorf-Astoria Hotel was most successful. The total registration reached over 2,200, against an estimated expectation of 1,500, and more than 400 representatives from over sixty foreign countries were present. From every viewpoint it was an outstanding success. The complete transactions will be published at some later date in the *Acta Pediatrica*, and hence our report is merely reportorial in character.

The most outstanding feature was the scientific exhibit, which spread beyond the ballroom floor of the Waldorf to distant parts of the hotel. Approximately 150 exhibits of the work and developments in our pediatric clinics were shown, and it would have required many days to give them the study they deserved. Obviously, months of work had been given to the perfection of the exhibits, whose graphic picture of the extent to which pediatric research has reached in this country in the past ten to fifteen years was overwhelming. Without comparing or in any way reflecting upon those unmentioned, it may be said that certain exhibits or groups were of particular interest. In the Wedgewood Room, far from the meetings, was a splendid exhibit from a number of clinics of the newer work on cardiac and intrathoracic surgery. Another was the exhibit on endocrine disorders of childhood and adolescence which a number of workers in other cities had joined with Dr. Lawson Wilkins of Baltimore in producing. The exhibit of the Virus Research Laboratories of the Children's Hospital of Philadelphia was most interesting, not only for the work but for the technical, graphic way in which it was presented. After the first day, many of those in attendance spent their time in the exhibits rather than the scheduled meetings. It was rumored, and we hope the rumor is true, that some thirty or more of the exhibits are to be microfilmed and thus made available for the more careful study they deserve and for teaching purposes in our medical schools. It would be a most valuable contribution and a worth-while, permanent memorial of the congress. To the many pediatricians who spent hours arranging the material for the exhibit and for the energy and work of the committee in charge, our sincere congratulations. Had there been no other program, the exhibits alone would have made the congress worth attending.

At the formal opening of the congress on Tuesday morning, July 15, addresses of welcome were made by Dr. Henry Helmholz, President of the Congress, Commissioner Bernecker, representing the Mayor of New York, Dr. Thomas Parran, Surgeon General, United States Public Health Service, and Miss Tenroot of the Children's Bureau. Dr. Parran read a message to the Congress from President Truman, which was as follows:

"The United States is honored to be host to the Fifth International Congress of Pediatrics. We welcome particularly the distinguished scientists from other lands who have come here to pool their knowledge with that of American pediatricians so that children everywhere may lead healthier lives. To promote the health of children the world over is a part of our task of building permanent world peace."

disease should be fully utilized by the extension of public health services, operating with the assistance of the General Practitioner;

4. General programs of *hygiene* and *sanitation* must be promulgated and carried out;

5. *Periodic examinations* at suitable intervals should be available to all. The early recognition of disease is the greatest weapon in its mastery;

6. *Complete examinations of all children,* should be linked with the means for correcting any deficiencies. This would greatly improve the health of our children;

7. A more general application of our present knowledge respecting *Goitre Control* could bring about a definite reduction in the frequency of this disease in affected areas. All such areas in Canada could be determined by careful study;

8. A well organized program to control *venereal disease* is necessary throughout the country.

9. Fifty thousand Canadians are now suffering from *cancer;* more than 12,000 die of cancer annually, yet many, if diagnosed and treated early, can be cured. An aggressive program to combat cancer should be an integral part of health insurance.

10. *Tuberculosis* might be eradicated from Canada in 25 years if facilities be provided for its early recognition and efficient control.

11. *Maternal Welfare.*—Maternal deaths and disabilities have been markedly lessened, but could be reduced still further by a maternal welfare plan which would incorporate all those features which have proven to be of value;

12. *Full dental care for children* is a prerequisite to good health;

13. *Pre-employment examinations* would help to direct individuals into employment which would be most suitable for them.

A progressive program for the improvement of the health and *physical development* of children and young people by supervised playgrounds and controlled exercises and physical fitness programs is desirable.

Also, the treatment of certain conditions is closely linked with the *housing* problem, and some integration of authority should be planned in this respect.

Such a general program would greatly assist in the fight to eliminate certain diseases such as diphtheria, whooping cough, tuberculosis, rickets, typhoid fever and smallpox, and would assist in the reduction in the frequency of many others, such as certain forms of mental disease, rheumatic heart disease, goitre, venereal disease and cancer.

As years pass the cost of curative services might be expected to materially decrease as disease is controlled and physical fitness increased.

B. General Practitioner Services

The fundamental service should be general practitioner service. When medical services are needed, such should be available without cost to the patient at the time. The individual should have the right to choose his medical adviser —and vice versa.

C. Specialists and Consultants

The science of medicine has progressed so rapidly that many conditions call for investigation and treatment by adequately trained and recognized specialists and consultants. This service is invaluable and must be freely available.

D. Additional Diagnostic Services

There should be available for all the people whatever diagnostic aid would be of value. This should include laboratory, radiological and other scientifically recognized diagnostic procedures and should also include consultant services. If

infant mortality in that country. Dr. C. Gyllenswärd of Upsala, Sweden, considered the problem of neonatal mortality one of medicine as well as social medicine. Professor A. Reuss of Vienna, Austria, discussed the medical causes of deaths in the neonatal period.

On Wednesday afternoon, sectional meetings were held in the building of the New York Academy of Medicine, which has just finished celebrating its Centennial. Sectional groups were held for the discussion of:

I. Factors in pregnancy affecting the child
II. Preventive pediatrics
III. Bio-immunological procedures
IV. Vitamin requirements and avitaminosis
V. Insect and other vectors of disease
VI. Rheumatic fever
VII. Endocrinology in childhood
VIII. Miscellaneous topics

The plenary session on Thursday morning, July 17, was given to a discussion of tuberculosis. Chief interest centered on the use of BCG. Dr. J. Wallgren of Stockholm, Sweden, feels that vaccination with BCG fills a gap in the fight against tuberculosis and compliments our present preventive methods for tuberculosis. Professor H. Jonscher of Poland thinks BCG should be used where there has been a nearly complete breakdown of public health and hospital facilities, as in Poland. Dr. A. Chattás of Cordova, Argentina, was most urgent for its use on a large scale.

The final plenary session on Thursday afternoon discussed incompatibility of blood, with Professor G. De Toni of Genoa, Italy, as the relator, and alimentary toxicosis as a second subject, with Professor E. Kerpel-Fronius of Pécs, Hungary, as relator.

On the social side, there were numerous activities. Among those were daily trips to sessions of the United Nations. On Wednesday afternoon some 1,500 of those present had a boat ride on the Hudson River as far as West Point. Supper was served on board, with dancing on the way back. It was a happy but tired crowd that piled into busses for the hotels at 11 P.M. The congress ended with a banquet at the Waldorf on Thursday night, at which the Findlay medal, a Cuban award, was presented to the President of the Congress, Dr. Helmholz. Among the speakers at the banquet were Dr. Lee Forrest Hill, president of the American Academy of Pediatrics, Dr. Wallgren, Dr. Escardo of Montevideo, Uruguay, and Dr. Robert Debré of Paris.

Nearly 100 of the foreign delegates are making a post congress tour of the midwest, visiting Cincinnati, Chicago, Rochester, Minn., Detroit, and Rochester, N. Y., while a smaller group is visiting clinics and points of interest in the East.

The planning and arrangement of the details of the congress were the work of many individuals. We dislike to single out any one person, as all shared in making it a success, but we feel that particular recognition should be given to Dr. L. Emmett Holt, Jr., of New York, the general secretary of the congress, who, for many months, has given his time and energy to its planning; that it took place was due in no small part to his work.

There is one other factor which should be widely known. Due to economic conditions prevailing in many countries, and currency and exchange restrictions, it was necessary to help meet the traveling expenses of a number of foreign delegates. A sizeable sum of money was raised for this purpose aside from the actual expenses of the meeting. The pediatricians are deeply in-

The inclusion only of those who are employed, or who receive up to a certain income, still makes no provision for the varying but usually large number who are in the group frequently referred to as "indigent" or "near-indigent." From the viewpoint of national health, and particularly from that of preventive medicine, it is most important that this group be covered.

(d) Friendly Societies as "Carriers" found undesirable

The utilization of Friendly or Benevolent Societies as carriers under the Act in one large national plan has had unfortunate results. Although politically expedient at the time to obtain support for the measure, it has now become obvious that these carriers have introduced a third party between patient and physician and between citizen and government. Over the years these carriers have developed large surpluses and have now become so powerful that, through their membership, they can dictate to the government in insurance matters. In another country they have played politics and have been more concerned with the competition for members than with the medical services rendered.

(e) Inadequate payment for services rendered

Inadequate payment for services rendered can be of serious concern to the general public for eventually it will result in a lowering of the quality of the service rendered. Physicians, dentists, nurses, technicians and all those rendering specialized or expert service should be compensated in accordance with their investment in years and in money in initial and post graduate training, and with their responsibilities and the arduous nature and dangers of their work. It is vitally important to the health of the nation to ensure that medicine of the future shall continue to attract a large percentage of the keenest young men and women of each generation.

(f) Inadequate provision for necessary diagnostic services

Some plans do not make provision for adequate diagnosis, such as laboratory and x-ray examinations and consultant services. When required these must be paid for by the patient or, as is frequently the case, be provided on a charity or part-pay basis by hospitals and consultants. This is not conducive to early diagnosis, effective treatment and prompt recovery.

(g) Lack of democratic principles in some plans

In one well established plan in a major European country the methods adopted are exceedingly dictatorial and bureaucratic and permit the individual member or those rendering the service little, if any, opportunity for stating grievances or correcting omissions or abuses. Health Insurance should be a well integrated partnership, with all parties concerned—the insured, those rendering the services and the state—given a voice in its direction.

(h) Preventive medicine and Public Health not emphasized in other plans

Of utmost importance, most existing plans of Health Insurance do not lay sufficient stress upon preventive medicine. The emphasis has been largely upon curative medicine. Canada has an opportunity to develop a system of Health Insurance which, by the inclusion of the preventive features already mentioned, can not only set new standards of Health Legislation, but can have an effect on our future national health far beyond our comprehension.

VII. ADDITIONAL FEATURES TO BE CONSIDERED IN ANY PLAN OF HEALTH INSURANCE

(a) In developing a Health Insurance plan in Canada great care should be taken to ensure that the proposals are sound and sufficiently comprehensive.

The medical profession recommends a complete service of high standard. To the medical profession it will mean great and in some respects unwelcome changes. We are, however, willing to assist in its formation and its operation. *provided* that it will secure for all the insured a high standard of service, as high

News and Notes

The American Board of Pediatrics will hold fall examinations on Dec. 5, 6, and 7, 1947, at Dallas, Texas, and on Jan. 9, 10, and 11, 1948, at Philadelphia, Pa. For further information write The Secretary, 718 Royal Union Bldg., Des Moines, Iowa.

The Public Health Report of June 20 summarizes the incidence of poliomyelitis in 1946 when 25,191 cases were reported. This is a greater number than for any prior year except 1916, and an increase of 85 per cent over 1945. The disease was of epidemic proportion in the North Central States and was high in some of the neighboring states. Minnesota had a morbidity rate of 115.1 per 100,000 of population and North Dakota one of 88.7. The incidence was also high in Wyoming and in Colorado where the morbidity rate was 80.9. The Middle and South Atlantic states had the lowest incidence as a whole. There has been a mounting increase in the ratio of cases reported to deaths in recent years. Thus in the period 1930-34 there were only 6.8 cases reported per death, while in 1946 the ratio was 13.3 per death. It seems probable that the increase in the number of cases is due in part at least to an increasing reporting of nonparalytic cases. Up to June 21 of this year (last figures available) the number of cases reported since the low seasonal week for the disease (March 15-21) was 513 as contrasted with 1,112 in 1946. California was the only state showing an increasing number of cases.

At the annual meeting of the Section on Pediatrics of the American Medical Association at Atlantic City in June, the following officers were elected for 1948: Chairman, Dr. Oscar Reiss, Los Angeles; Vice-Chairman, Dr. Stanley Gibson, Chicago; and Secretary, Dr. M. M. Nicholson, Washington, D. C.

THE HOSPITAL ACT AND YOUR COMMUNITY

If you are interested in the hospital program, authorized last year by the Hospital Survey and Construction Act, this booklet will tell you, in simple terms, what the Act means to you, your community, and your State. It should be especially valuable to any group or community that wants to build a hospital but does not know how it goes about getting Federal aid for construction. Single copies are available free on request to the U. S. Public Health Service, Washington 25, D. C.

members will be representative of and preferably nominated by the various professional and other groups interested in the operation of the Act.

(d) Certain details might wisely be left to the Province.

Among these might be:

1. The income level (which might be high enough to include all the residents, or set at an agreed level which might vary in the various Provinces) below which the residents would be included under an obligatory plan;

2. The rate and method of payment for all services, professional and institutional;

3. The best means of obtaining full preventive and public health services within the Province concerned;

4. The particular means which might be necessary to safeguard the basic necessity of maintaining adequate teaching services in connection with Medical Faculties and Teaching Hospitals within the Province.

(e) The patient of little or no income should be included.

Those patients, frequently termed "indigents," who cannot pay for adequate health services should be included. It would be grossly unfair, not only to the public, but also to those rendering the health services, to omit this group from the benefits of the plan. Provision for the inclusion of such patients should be specifically made in the federal enabling and provincial Acts.

(f) The Plan should be on a contributory basis.

The principle of having those participating in the benefits contribute to the Fund would seem to be sound. The individual who shares in the cost of providing the benefits is much more likely to co-operate in keeping down unnecessary calls upon the Fund. For those not employed by others, a basis of direct assessment could be worked out.

(g) Remuneration.

The remuneration of those rendering the services required under this Plan should be reasonable and in conformity with the high standards of service expected of them. In the case of the medical practitioner (general practitioner), it is obvious that some variation in the basis of remuneration may be necessary in different areas. In some areas a "fee-for-service" basis may be desirable; in others a "capitation" basis (so much per annum per individual on a panel, irrespective of the amount of service rendered) may be preferable; in other areas, particularly certain rural areas where the population is small and scattered, a "salary" basis, or a combination of any two of these three alternative methods may prove desirable. Because of this situation it is recommended that the method of remuneration, as well as the amount, be left for decision in the individual province after consultation between the Commission and representatives of the medical profession.

In the case of the specialist or consultant it would seem necessary to follow a fee-for-service basis.

(h) Medical Education must be maintained at a high standard.

Fully trained medical personnel in sufficient numbers are absolutely necessary to any plan of general Health Insurance. Such are necessary for the health welfare and the future of the nation. If anything happens to the proper teaching of succeeding generations of doctors, scientific medicine dies and with it declines the health of the nation. The truth of this assertion is obvious.

Heretofore clinical teaching has been carried on in wards set aside for that purpose; these have usually been the public wards of our large teaching hospitals. The hospital service has either been free to the patient or at minimal rates and the medical attention has been without charge. Although the patients have been available for the bedside discussion and demonstration of methods of examination and treatment, the service has been of the highest standard of excellence and always with the complete co-operation of the patients concerned. Under a Health

experiments in studying the preschool child as an individual with feelings and with intelligence. Various new techniques of studying the projection of feelings through play and art are described. Part Three deals with theory about principles of children's art and the development of a child's personality. It contains a chapter on research methods in child study which should interest particularly the scientifically trained pediatrician who has so long decried the unscientific research techniques of the psychologist and psychiatrist. Following this is a bibliography of 628 publications. This book will furnish much useful information to the practitioner of pediatrics who reads it in small bits when stimulated to seek information about topics which are presented in the everyday care of preschool children. For the pediatrician with psychiatric experience and for the individual doing research in child development, the book has still greater value not only as a source book, but also as a bibliographical reference.

SENN.

It should also be proper for any institution or any member of any profession to decline to act under the Plan and to offer services in a private capacity under any arragnements which are agreeable to themselves and to their patients provided these arrangements are not contrary to public interest.

(j) If cash benefits be provided for loss of time through illness, such should be through a separate fund entirely apart from the Health Insurance Fund.

Cash benefits, obviously, are a matter of great importance to the insured. It is entirely true "that a person sick needs financial assistance more than a person well." This is realized, yet from the viewpoint of conscientious medical service cash benefits incorporated in Health Insurance have introduced serious complications.

In every country where cash compensation for loss of time has been a part of a sickness insurance plan, there has been great dissatisfaction over the complications of operation which have developed and the drain on the common fund because of its inclusion. Because of experience gained in other countries operating a Health Insurance plan, we strongly recommend that such assistance be provided through some plan to be devised *entirely apart* from the Health Insurance plan.

VIII. CAN HEALTH INSURANCE MEET THE MEDICAL NEEDS OF SPARSELY SETTLED COMMUNITIES

The answer is "yes." In areas where a doctor could not make an adequate living on the ordinary basis of remuneration under the plan, the Commission could provide a salary adequate enough to prove attractive to our doctors. If district nursing service be provided, as well as adequate diagnostic and reasonable hospitalization facilities, and if reasonable opportunities to get away for post graduate study or for vacation be made available, our doctors will go to rural areas. If bursaries be made available to permit brilliant young people without adequate financial means to complete the medical course, their services in such areas for a definite period of years could be required. The same effect could be obtained, as has been done in Australia, by offering young men and women opportunities for post graduate study upon the completion of a definite period of service in rural communities.

IX. HEALTH AND HEALTH PRESERVATION IN THE YEARS TO COME

During the past two generations more progress has been achieved in making good health care available to all than for the two previous centuries. We anticipate still greater progress in the years to come.

Improved Facilities for Diagnosis

Better and more readily available diagnostic procedures will do much to still further reduce illness. It is hoped that the present commendable system in many provinces of having certain swabs, smears, blood samples, etc., examined by the Department of Health will be extended. The setting up of branch laboratories has been of tremendous assistance. The establishment of "diagnostic centres" in strategic locations may be anticipated. These could be governed by adequate regulations relating to the nature and quality of service, charges and remuneration and to ethical relations. As the inclusion of people of inadequate means under a health insurance plan may make most hospital out-door departments unnecessary, some of these facilities might be converted into "diagnostic clinics" or centres for referred patients.

Rural Medicine

Rural medicine will be better organized in years to come. Good care must be available to all. This does not mean that a highly trained doctor must sit

THE FIFTH INTERNATIONAL CONGRESS OF PEDIATRICS

There were many, including the writer, who had serious doubts as to the advisability of holding the Fifth International Congress of Pediatrics this year. Due to the war, it has been postponed for several years, and to many of us the wise course seemed to put it off until world conditions become more settled. We were wrong, and those who urged the Congress at this time were right. It was an outstanding success. An old friend from one of the war-torn countries tried to tell me what it meant to him to attend a meeting with his pediatric colleagues and friends from all over the world, after years of scientific and medical isolation, and to see developments of which he knew little. "I feel as if I had been born again and am going back filled with the desire to work once more."

All the time the meeting was going on with the closest friendship and feeling among the representatives from over sixty countries, the newspapers were filled with stories of distrust and threats of war throughout the world. A meeting such as the Fifth Congress makes one wonder if it is not possible in some way to spread the religion of medicine and the feeling of physicians toward their work and toward one another into other spheres. If this could be done, there would be no distrust or talk of war.

Certainly in times such as these, of world turmoil and trouble, the holding of the Congress shows there is a background of peace and decency left in the world.

B. S. V.

conditions. As transportation facilities improve the need for numerous rural hospitals should decrease rather than increase. Moreover, if rural and urban hospitals could be so linked that patients could be quickly transferred when necessary to institutions with more elaborate equipment, the net result should be a reduction of mortality, more rapid convalescence and a definite saving of both skilled personnel and special equipment.

One regrettable gap in our present facilities will surely be corrected—more hospitals for convalescent patients and for those suffering from chronic or incurable illnesses. Actually such provision would be a distinct economy.

Should these improvements be combined with general increase in social security and health planning—assured employment and maintenance, better nutrition, better sanitation, better housing and planned physical programs—the improvement in national health would be amazing.

Conclusion

Throughout the last ten years, The Canadian Medical Association has consistently and repeatedly sought to ascertain the opinion of the medical profession on the subject of Health Insurance. The views expressed in this submission crystallize those opinions.

Since this memorandum was prepared, there has been placed in your hands the Draft proposals of the Advisory Committee on Health Insurance. While some of us have had the opportunity of seeing these proposals, they have not been seen by our constituent societies. It is our hope that in the immediate future the medical profession throughout Canada will be permitted to examine these proposals in detail and that shortly thereafter we may be in a position to come back to you to discuss those aspects of the proposals upon which you might desire our advice and opinion.

In conclusion, The Canadian Medical Association desires to assure the Special Committee on Social Security that our entire organization stretching from sea to sea stands ready to render any assistance in its power towards the solution of one of the country's most important problems, namely, the safeguarding of the health of our people.

Articles to appear in early issues of

The JOURNAL OF PEDIATRICS

COMBINED IMMUNIZATION AGAINST DIPHTHERIA, TETANUS, AND PERTUSSIS IN CHILDREN OVER THREE MONTHS OF AGE: INCLUDING AN EVALUATION OF THE EFFECTIVENESS OF TWO IMMUNIZATION AGENTS.
By Paul A. di Sant' Agnese, M.D., New York, N. Y.

MYOCARDIAL INFARCTION IN THE NEWBORN INFANT.
By Robert M. Ravich, M.D., and Philip Rosenblatt, M.D., Brooklyn, N.Y.

STUTTERING, A REORIENTATION.
By W. Hugh Missildine, M.D., and Philip J. Glasner, M.D., Baltimore, Md.

EPIDEMIOLOGIC STUDIES IN DENTAL CARIES. II. THE INCIDENCE OF CARIES AMONG INSTITUTIONAL CHILDREN.
By Julian D. Boyd, M.D., and Virgil D. Cheyne, D.D.S., Iowa City, Iowa.

A COMPARISON OF VITAMIN C IN MOTHERS AND THEIR PREMATURE NEWBORN INFANTS.
By Lawrence B. Slobody, M.D., Reuel A. Benson, M.D., and Joan Mestern, New York, N. Y.

PSYCHIATRIC SERVICES IN A CHILDREN'S HOSPITAL.
By S. A. Szurek, M.D., San Francisco, Calif.

A REVIEW OF THE SUBJECT OF CONGENITAL HEMIHYPERTROPHY AND A COMPLETE CASE REPORT.
By John Ward, M.D., and Henry H. Lerner, M.D., Salt Lake City, Utah.

ABDOMINAL ABSCESS AS A CAUSE OF INTESTINAL OBSTRUCTION IN THE NEWBORN INFANT.
By Julius B. Richmond, M.D., and Herbert R. Moore, M.D., Chicago, Ill.

COOLEY'S ERYTHROBLASTIC ANEMIA IN TWO CHINESE BOYS.
By Luther B. Gardner, M.D., New York, N. Y.

HYPERSENSITIVITY TO PRIVINE.
By Jacob Greenblatt, M.D., Stamford, Conn.

PORTAL CIRRHOSIS OF THE LIVER. CASE REPORT WITH DISCUSSION OF PROBLEMS.
By Walter M. Block, M.D., Cedar Rapids, Iowa.

THE CLINICAL PICTURE OF ENCEPHALITIS AND REPORT OF A CASE WITHOUT PAROTITIS.
By First Lieutenant Walter R. Eberlein and First Lieutenant Chester P. Lynxwiler, M.C., Army of the United States.

SOME FACTORS WHICH INFLUENCE THE DURATION OF BREAST FEEDING.
By Mildred A. Norval, M.D., Rochester, Minn.

SCLEREMA ADIPOSUM NEONATORUM. (REPORT OF A CASE WITH NECROPSY.)
By Albert Sternbach, M.D., and Joseph Robinson, M.D., Brooklyn, N. Y.

DENTAL CARIES EXPERIENCE IN POSTWAR ITALY (1945). II. AMONG TEEN-AGE CHILDREN IN NAPLES.
By Maury Massler, D.D.S., M.S., and Isaac Schour, D.D.S., Ph.D., Chicago, Ill.

THE PRIMARY ETIOLOGY OF THE SPECIFIC LANGUAGE DISABILITIES.
By Richard S. Eustis, M.D., Boston, Mass.

THE SUBCUTANEOUS ADMINISTRATION OF SODIUM SULFADIAZINE.
By Gilbert B. Forbes, M.D., George Donnell, M.D., and John C. Herweg, M.D., St. Louis, Mo.

RHEUMATIC FEVER RECURRENCES IN CHILDREN WITHOUT SULFONAMIDE PROPHYLAXIS. AN EVALUATION OF ENVIRONMENTAL FACTORS.
By Robert L. Jackson, M.D., Helen G. Kelly, M.S., Cecilia Healy Rohret, M.A., and Julia M. Duane, M.D., Iowa City, Iowa.

General Frederick H. Osborn, Deputy Representative, United Nations Atomic Energy Commission, then welcomed the delegates on behalf of the United Nations, and, in a brief but forceful talk, contrasted the work of his commission in its efforts to control the destructive forces of atomic energy with the work of the pediatricians of the world gathered to improve the welfare of children and the future generations of the world. He stressed the blocking of world unity by a certain ruling group of 10 per cent of the world population, and expressed the thought that, as, after the religious wars of past centuries, man had learned that peoples with religious differences could live side-by-side in peace, so man must learn that peoples with different ideological economic theories can live in peace, and that war for economic and social ideologies is unnecessary.

The first plenary session, on the subject of nutrition, was held on Tuesday afternoon. Professor R. A. McCance of Cambridge, England, discussed the findings of the British Research Council Unit, which studied the nutritional condition of children in the British Zone in Germany. Despite the low caloric intake provided for children, he did not feel that any serious damage had been done and that the nutritional health of German children was not a matter for present concern. Dr. J. P. H. Jonxis of Rotterdam, Holland, discussed the nutritional status of the Dutch children and the studies which had been carried out on their nutritional needs. He concluded that the lack of Vitamins A and D and of animal proteins were the serious deficits in the diet of children in Holland as a result of the war, and that these were of greater importance than the question of calories. Dr. J. Gillman, of Johannesburg, South Africa, discussed and presented interesting slides of childhood pellagra. Dr. P. Plum of Copenhagen, Denmark, discussed celiac disease, the incidence of which increased markedly in Norway, Denmark, and Finland during the war, but not in Sweden, which was an unoccupied country. This led to the impression that some nutritional factor was of etiologic importance in the disease. Dr. G. Logaras of Athens, Greece, discussed the nutrition of children in Greece and the curtailed food supply. Dr. D. Riis of Oslo, Norway, described conditions in his country. Throughout the war, due to planned measures of food allotment, the babies in Norway remained in good condition, but the nutrition of children of school age was impaired with a marked decrease in height and weight growth compared with prewar standards. An interesting observation was a decrease in dental caries in the school-age children. This observation is in agreement with the findings in a study of Italian children which will appear shortly in the JOURNAL.

The discussion at the plenary session on Wednesday morning was on three subjects. The first subject was "Diseases Caused by Filtrable Viruses." Dr. A. Sabin of Cincinnati, Ohio, summarized our knowledge of neurotropic viruses, with emphasis on poliomyelitis, and Dr. Thomas Francis gave the principal talk on the respiratory viruses. The second subject was "Chemotherapy of Infectious Diseases." The principal speaker was Dr. Chester S. Keefer of Boston, who summarized the uses of streptomycin. Professor G. Frontali of Rome, Italy, discussed penicillin, and Professor R. Degkwitz of Hamburg, Germany, described what he termed "aimed injections" of drugs into such organs as the liver, spleen, and bone marrow. Such drugs must be insoluble in water and crystallizable.

The third topic was "Neonatal Mortality," with Professor Alan Moncrieff of London, England, as the principal speaker. He discussed the diminishing birth rate in England and the necessity of reducing the infant mortality rates, which led to a study of the causes and the instigation of measures to reduce

LACTOGEN + WATER = FORMULA

1 LEVEL TABLESPOON	2 OUNCES	2 FLUID OUNCES
40 CALORIES (APPROX.)		20 CALORIES PER OZ. (APPROX.)



Successful in Infant Nutrition



DEXTROGEN + WATER = FORMULA

1 FLUID OUNCE	1½ OUNCES	2½ FLUID OUNCES
50 CALORIES		20 CALORIES PER OUNCE

No advertising or feeding directions, except to physicians. For feeding directions and prescription pads, send your professional blank to

Nestlé's Milk Products, Inc.

155 EAST 44TH ST., NEW YORK, 17, N.Y.

debted to those who contributed so generously to this fund; hence we close this account of the congress with thanks to the following:

American Friends Service Committee
American Red Cross
American Relief for Czechoslovakia
American Scandinavian Foundation
English-Speaking Union
Otto Grob
Help Finland, Inc.
Institute of International Education
Kosciuszko Foundation
Lessing Rosenwald Foundation
Josiah Macy, Jr., Foundation
Masaryk Institute
Samuel R. Milbank
Milbank Memorial Fund
New York Foundation
Oberlander Trust
Frederick Osborn
Pabst Foundation
Alexander Pathy
Rockefeller Foundation
Save the Children Foundation
Judith Schoellkopf
George Skouras
Stephen Stephanides
Uihlein Foundation
United Yugoslav Relief Fund
Unitarian Service Committee
World Health Organization Interim Commission

A number of business firms consented to become patrons of the Congress by contributing to its cost.

These firms are:

The Gordon Armstrong Company
Beachnut Packing Company
Burroughs, Wellcome & Company
Johnson & Johnson
Lederle Laboratories
M & R Dietetic Laboratories
Mead Johnson & Company
National Dairy Products Company
Nestlé's Milk Products, Inc.
Procter and Gamble Company
Swift & Company
White Laboratories



Dennison DIAPER LINERS

Physicians and nurses have found that Dennison Diaper Liners make the diaper problem simpler and easier for new mothers. Physicians and nurses recommend Diaper Liners because they are sanitary, and so soft next to baby's tender skin that they help prevent chafing and help guard against diaper rash.

Diaper Liners make diaper washing much less disagreeable. Hours of hard scrubbing are eliminated. The Liner is simply folded inside diaper. When soiled, the Liner is flushed away. Quick, simple, easy!

Suggest Dennison Diaper Liners to new mothers, and to your hospital, too. The cost is only a few cents a day.

DELUXE: 180 for $1.00—Cradle Time & Downeesoft: 180 for 69c

DENNISON, Dept. V-214
Framingham, Mass.

FREE Please send me a whole day's supply of Dennison Diaper Liners.

Name. . . . . .

Street . . . . . .

City Zone State

A true Castile Soap you can recommend with confidence



For over 30 years Stork Castile has been recognized and recommended by members of the medical profession as a pure, mild soap made especially for babies.

Now Stork Castile is *enriched* with skin-soothing Lanolin to help sensitive infant skin retain its natural lubrication.

Note: Samples of two new companion products, Stork Baby Oil and Stork Baby Powder, are available upon request to Stork Baby Products, 1351 West 31st Street, Chicago, 9, Illinois.

STORK Castile Soap

MADE ESPECIALLY

Book Reviews

Child and Adolescent Life in Health and Disease. A Study in Social Paediatrics. W. S. Craig, Baltimore, 1946, Williams and Wilkins Co., 667 pages. Price $7.00.

It is sincerely to be hoped that someone will do for the United States what Dr. Craig of Edinburg has done for Great Britain in this volume of "social pediatrics." In Part I he has traced the historic background and development of the many measures which have been developed over the years for the care and protection of the child. Some of the effort has been due to voluntary agencies and philanthropy, and some to governmental action. The most striking thing is the myriad of agencies which have developed and now exist to take care of some one need or interest, with a resulting overlapping of function and a most confusing present-day picture when looked upon as a whole. The same situation exists in our own country, but it is doubtful if the means and mechanisms which are available today to protect and insure the health of the child could have been developed in any other way. The book shows unending research. In Part I, the work and part played by voluntary agencies, the care of the dependent and defective child, the development of hospitals and medical care, school hygiene, and infant and child welfare are traced from their earliest beginning to their present-day status.

In Part II, the author presents the care of child life at the present time, the laws for protection of the child, and the present-day agencies for maintaining health, and the care of the sick and handicapped child. To this he has added a most interesting chapter on the child under conditions of total war which discusses the problems and measures taken to protect the children of Great Britain in World War II. This summary of the problem of evacuation is most important and should be read by all who might, at some future time be faced with a similar problem. Part III is a brief discussion of the future, in which the author stresses the need for research on a broad basis and the importance of child hygiene in medical education. Part IV is in the nature of an appendix discussing the various laws relating to child health and welfare in Great Britain.

It is a book not only of interest and importance to the pediatrician, but equally to the social worker and public official. It is a most unique book in that while specific phases of child care have been reviewed and presented in a monograph form, for the first time so far as we know, the attempt has been made to present the picture of child care as a whole.

B. S. V.

The Personality of the Preschool Child. Werner Wolf, New York, 1946, Grune & Stratton, 341 pages. Price $5.00.

The personality of the preschool child has interested educators and psychologists more than physicians. Even contributions from psychiatrists about this age period are meagre. This book is the work of a psychologist, who, as an educator and researcher, has a special interest in the emotional development of children.

The book is made up of three parts. Part One deals with material which was obtained by direct observation of children in the setting of nursery school and home. In this section one finds much interesting and valuable information about the mind of the child and how it functions, what the language of his emotions are and in what the child's concept of reality consists. There is mention of such important items as dreams, play, and social life. The reader will find discussions of the topics of birth and death which every healthy child sooner or later presents to his parents and teachers. In Part Two, the author deals with his

THE JOURNAL OF PEDIATRICS

EDITOR

BORDEN S. VEEDER, M.D., 3720 Washington Blvd., St. Louis 8, Mo.

PUBLISHED BY THE C. V. MOSBY COMPANY, 3207 WASHINGTON BLVD.
ST. LOUIS 3, U. S. A.

Entered at the Post Office at St. Louis, Mo., as Second Class Matter.

Published Monthly, Subscriptions may begin at any time.

Editorial Communications

Original Communications.—Manuscripts for publication and correspondence relating to them should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo., U. S. A. Articles are accepted for publication upon the understanding that they are contributed solely to The Journal of Pediatrics.

Articles and Comments for the Department, The Social Aspects of Medicine.—All material for this section should be sent to Dr. Edwards A. Park, The Johns Hopkins Hospital, Baltimore 5, Md., U. S. A.

Manuscripts should be typewritten on one side of the paper only, with double spacing, and liberal margins. References should be placed at the end of the article and should include, in the order given, name of author, journal, volume, page and year; e.g., Smith: J. Pediat. 1: 10, 1932. Journal abbreviations as used in the publications of the American Medical Association should be followed. Illustrations accompanying manuscripts should be numbered, provided with suitable legends, and marked on margin or back with author's name. Articles accepted for publication are subject to editorial revision.

Neither the editors nor the publishers accept responsibility for the views and statements of authors as published in their "Original Communications."

Illustrations.—A reasonable number of half-tone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editor for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered only in India ink, or black typewriter ribbon (when the typewriter is used), as ordinary blue ink or colors will not reproduce. Only good photographic prints or drawings should be supplied for half-tone work.

Books for Review.—Only such books as are considered of interest and value to subscribers will be reviewed, and no published acknowledgment of books received will be made. These should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo.

Reprints.—Reprints of articles published among "Original Communications," must be ordered specifically, in separate communication to the publishers, The C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, U. S. A., who will send their schedule of prices. Individual reprints of an article must be obtained through the author.

Business Communications

Business Communications.—All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.

Subscription Rates.—Single copies, 75c. In the United States and other countries of the U. S. Postal Zone, $8.50 per year in advance. In Canada and other foreign countries $9.50.

Remittances.—Remittances for subscriptions should be made by check, draft, post-office or express money order, or registered letter, payable to the publishers, The C. V. Mosby Co.

Change of Address.—The publishers should be advised of change of subscriber's address about fifteen days before the date of issue, with both new and old addresses given.

Advertisements.—Only articles of known scientific value will be given space. Forms close tenth of month preceding date of issue. Advertising rates and page sizes on application.

Editor's Column

THE CANADIAN MEDICAL ASSOCIATION AND HEALTH INSURANCE

The relationship between medicine in Canada and medicine in the United States has always been close. The medical schools of both countries have the same Scotch-English heritage. The general scheme of medical practice and hospital organization is quite the same. Many outstanding leaders, as Osler, have taught in both countries, and hundreds of our younger physicians have interchanged for their education and training. Nearly all of our special societies include Canadians in their membership, and frequently these societies meet in Canadian cities. The two large national societies, the Canadian Medical Association and the American Medical Association, are quite similar in their character and plan of organization. As a result there exists a close interchange of medical thought between the two countries as well as close friendships between members of the profession.

In light of this close relationship and common interests the "Submission Respecting Health Insurance by the Canadian Medical Association" to the "Special Committee on Social Security" of the Canadian House of Commons, which is reprinted in Dr. Park's column on "The Social Aspects of Medicine" in this issue (p. 228) gives food for much thought. Exactly the same problems are facing medical practice in Canada as exist here in the United States: problems of the distribution of good medical care, problems of making good medical care available to all, problems of the increasing cost of good medical care due to technical and scientific advances, problems of hospitals, problems of medical education. In view of the similarity of the problems facing medicine in the two countries, the attitude of the medical profession in Canada, as represented by their national association, is not only of interest but importance. Throughout the ten years prior to the "Submission" in 1943, the Canadian Medical Association consistently sought to ascertain the opinion of the medical profession on the subject of health insurance, and the "Submission" crystallizes these opinions which are presented in the report.

It should be read in its entirety by all our readers, who, whether they are interested or not, are involved in this pressing question of health insurance. In the Canadian report, the proposals of the Canadian Association are clear, simply stated, liberal, and full of common sense.

With this attitude of help and cooperation on the part of the Canadian Medical Association in assisting the Canadian government in solving the complicated problem of medical care for its citizenry, we are satisfied that the interests of the Canadian practitioner will be fully protected in whatever legislation is finally promulgated.



Permission Peter Arno
© The New Yorker
Magazine, Inc

PUZZLE:

Station Scene, 1957. Find the man who is getting a steady income from U. S. Savings Bonds. He was smart enough to start buying, back in 1947.

Of all the ways of saving up a tidy sum of money, one of the *easiest* and *safest* ways is to invest your money in U. S. Bonds.

You can buy Bonds either through the Payroll Savings Plan at your place of business—or if the Payroll Plan is not available to you, but you *do* have a checking account, through the Bond-a-Month Plan at your local bank.

Both ways repay you $4 for every $3 you save, by the time your Bonds mature. Choose the sum you can afford—and start saving today!

Save the easy, automatic way — with U.S. Savings Bonds

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.

Here's a price that's gone down,

Not once... but twice

IT'S THE PRICE OF PET MILK. Two reductions since the first of the year... That's of interest to the physician who prescribes feeding formulas for babies.

Every mother wants, of course, to feed her baby a milk that's safe, readily digestible and dependably nutritious... but, like everybody else in these days of high prices, she's interested in what it costs. When you prescribe Pet Milk you can, when you think advisable, go beyond assuring mothers of its safety and other qualities essential to the welfare of their babies; you can assure them that Pet Milk not only costs less generally than other forms of milk, but that its price is now lower than it was six months ago.

And whether future commodity prices are high or low you can always depend upon Pet Milk to be a comparatively inexpensive form of milk. Evaporated to twice the richness of whole milk and packed in hermetically sealed containers it can be distributed from plants to consumers with greater economy. The saving that results is passed on to consumers and, therefore, the lower price of Pet Milk is a fixed advantage — an advantage that has contributed substantially to its extensive use in infant feeding.

PET MILK COMPANY, 1437-H Arcade Bldg., St. Louis 1, Mo.



Now You Can Have . . .

McCormick's 2nd Edition

PATHOLOGY OF LABOR, THE PUERPERIUM AND THE NEWBORN

by

CHARLES O. McCORMICK, A.B., M.D., F.A.C.S., Clinical Professor of Obstetrics, Indiana University School of Medicine.

512 pages, 272 illustrations, 22 in color.

Price $8.50

Chapter Headings

Abnormal Labor
Obstetric Injuries
Post-Partum Hemorrhage
Obstetric Operations
Puerperal Infection
Secondary or Late Post-Partum Hemorrhage
Anomalies and Diseases of the Breasts
Other Complications of the Puerperium
Conditions Related to Delivery (Accidents and Injuries)
Conditions of Congenital Origin (Malformations)
Conditions Peculiar to Newborn Period
Appendix

A VERY thorough revision has been accomplished to make the second edition of this volume an even more valuable refresher guide.

Important additions have been made in virtually every section and a total of 91 illustrations has been added. These new illustrations portray many of the new topics which are discussed.

A partial digest of the topics which have been expanded or added to the text follows:

Treatment of missed labor with estrogens; pelvioradiography; value in abnormal labor; the Caldwell Moloy classification of female pelvis—gynecoid, android, platypelloid and anthropoid; antenatal management of contracted pelvis.

Distinguishing signs and symbols of abruptio placenta previa in chart form; expression of the placenta—Pastore Technique, Brand Technique, modification of Brand Technique by author; elaboration on Cesarean operations—indications and contra-indications and prognosis; treatment of phlegmasia alba dolens.

Use of penicillin in puerperal infection; use of streptomycin; labor complicated with cardiac diseases and diabetes; erythroblastosis; Appendix—demerol and scopolamine; bed posture and exercise; early puerperal rising; religious requirements and instruction.

This book continues to be a guide which is complete without being cumbersome—a guide dedicated to the recognition and proper evaluation of the pathologic. The author gives you the essentials of present-day obstetric thought on major and minor complications in easily assimilated form.

THE C. V. MOSBY COMPANY
3207 Washington Blvd.,
St. Louis 3, Mo.

M. J.

Gentlemen: Please send me a copy of the new 2nd Edition of:

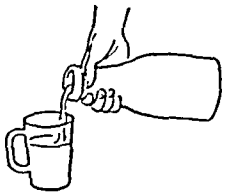
PATHOLOGY OF LABOR, THE PUERPERIUM AND THE NEWBORN

_____Attached is my check for $_____. _____Charge my account.

Name _____

Address _____

for those **sensitive** to the proteins in milk . . .







• When children (infants and adults, too) are unable to tolerate the animal proteins in cow's milk, MULL-SOY—the emulsified soy concentrate—is the replacement of choice. It is highly palatable, and easily digestible, without the offending proteins of animal origin.

• MULL-SOY is a biologically complete vegetable source of all essential amino acids. In standard 1:1 dilution, it also provides the other important nutritional factors of fat, carbohydrate and minerals in quantities that closely approximate those of cow's milk.

• To prepare MULL-SOY, simply dilute with equal parts of water.

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N. Y.
In Canada write The Borden Company, Limited, Spadina Crescent, Toronto

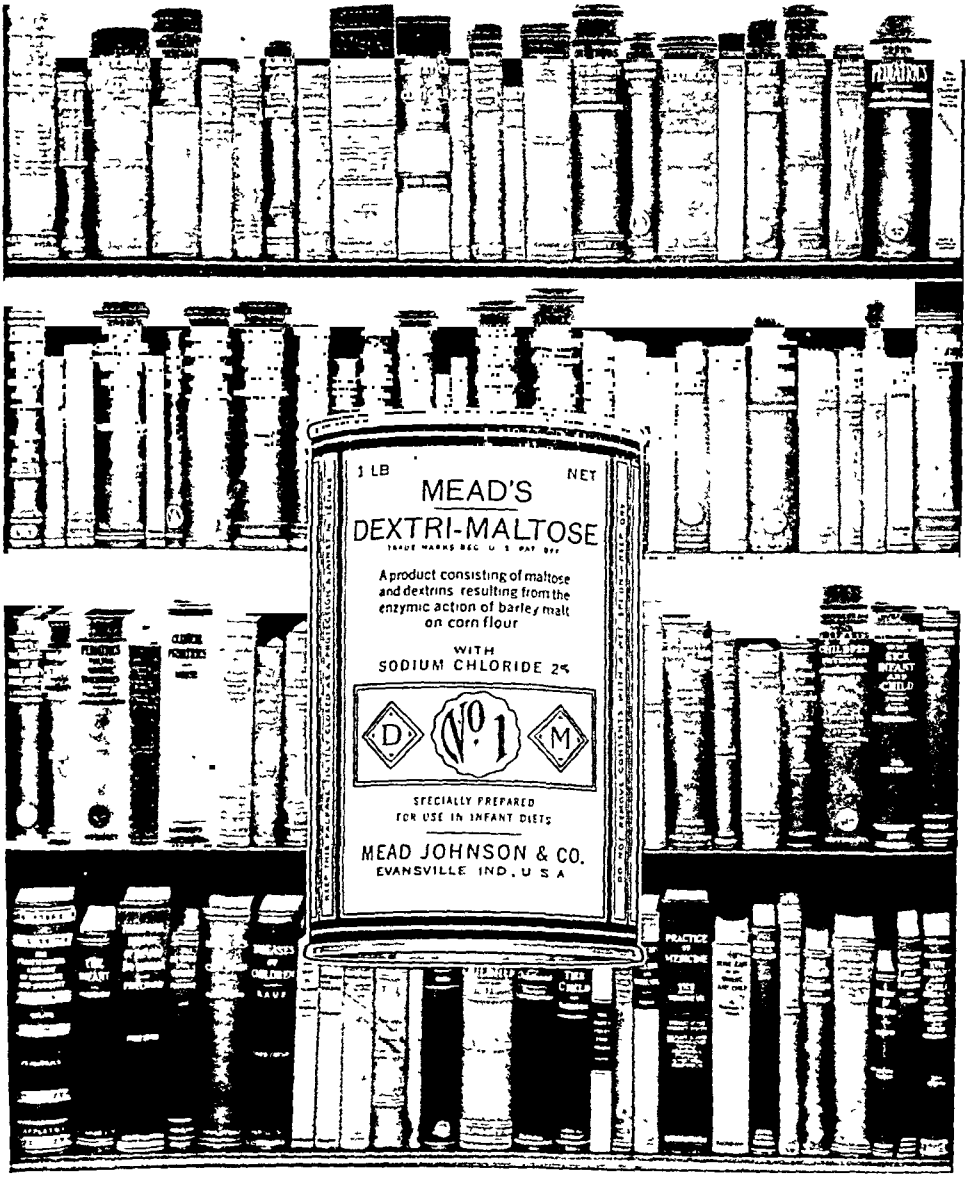
mull-Soy



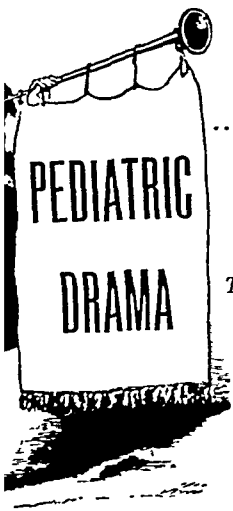
MULL-SOY is a liquid hypoallergenic food prepared from water, soy flour, soy oil, dextrose, sucrose, calcium phosphate, calcium carbonate, salt and soy lecithin, homogenized and sterilized. Available in 15½ fl. oz. cans at drug stores everywhere.

when milk becomes "forbidden food"

BACKGROUND



THE use of cow's milk, water and carbohydrate mixtures represents the one system of infant feeding that consistently, for over three decades, has received universal pediatric recognition. No carbohydrate employed in this system of infant feeding enjoys so rich and enduring a background of authoritative clinical experience as Mead's Dextri-Maltose.



A BABY

SCENE I

"a thin, pale . . . restless, whining infant refusing part of its formula . . ."



SAME BABY
Time: 2 weeks later

SCENE II

—now "a happy, rosy-cheeked, smiling baby whose appetite never seemed completely satisfied and whose gain in weight was remarkable."



Between the scenes, this dramatic change was achieved with vitamin B therapy.[1] The lack of appetite from which the baby suffered is a serious matter in infancy, and one of the commonest problems in pediatrics. Many doctors now prescribe 'Ryzamin-B' No. 2 to combat infant anorexia. Its rich vitamin B content provides the needed appetite stimulation: the convenience with which it may be administered in formula or fruit juice makes it especially adaptable to pediatric needs.

Older children enjoy 'Ryzamin-B' No. 2 from the special measuring spoon, as a delicious spread when mixed with jam or peanut butter, or dissolved in milk, fruit juice or other beverages. Containing the natural B complex as a concentrate of Oryza sativa (American rice) polishings, 'Ryzamin-B' No. 2 also supplies potent synthetic B factors.

'RYZAMIN-B' BRAND RICE POLISHINGS CONCENTRATE **NO. 2**

WITH ADDED THIAMINE HYDROCHLORIDE, RIBOFLAVIN AND NICOTINAMIDE

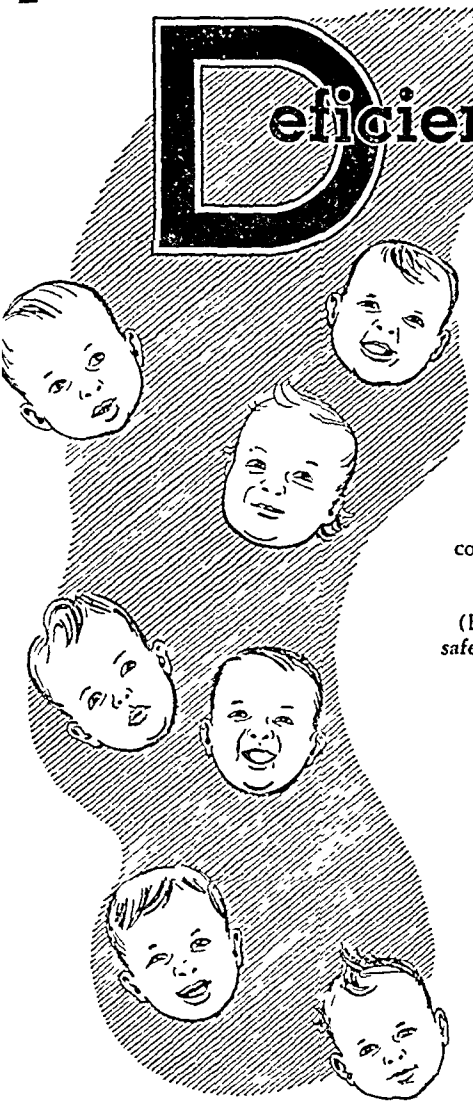
TUBES OF 2 OZ. AND BOTTLES OF 8 OZ.

1. Hoobler, B. P., Quoted in Form's Foundation of Nutrition, N. Y., Macmillan Co., 1933, p. 273 • 'Ryzamin-B' reg. trademark

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

protein

Deficiency [in children] is much more common than is generally realized."*



Investigators have shown that when the variety of foods is limited – as in infant feeding – care must be exercised in their selection . . . the chief consideration being "the furnishing of the essential amino acids to be made available to the tissues by digestion."*

DRYCO, spray-dried for ready reconstitution in cold or warm water, provides the physician with a remarkably flexible basic high protein food, containing all the essential amino acids. It is ideally suited to the changing nutritional requirements of the normal or abnormal infant. Easily digestible (because of its soft curd characteristics), bacteriologically safe and *constant in composition – this vitamin-fortified, improved, irradiated* infant food may be readily adapted to six distinct types of formulas:

1. DRYCO alone *(high protein, low fat, low carbohydrate).*
2. DRYCO with carbohydrate *(high protein, low fat, high carbohydrate).*
3. DRYCO with whole milk—fresh, evaporated or dried *(high protein, intermediate fat, low carbohydrate).*
4. DRYCO with whole milk—fresh, evaporated or dried—and carbohydrate *(high protein, intermediate fat, high carbohydrate).*
5. DRYCO with skim milk—fresh or dried *(high protein, exceptionally low fat, low carbohydrate).*
6. DRYCO with skim milk—fresh or dried—and carbohydrate *(high protein, exceptionally low fat, high carbohydrate).*

*A.M.A : *Handbook of Nutrition, Chicago, 1943.*

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N. Y.

-DRYCO [illegible] from [illegible] pasteurized, superior quality [illegible] 1 U.S.P. units of vitamin A reconstituted quart. Each tablespoon supplies 31½ calories. Dryco is available at all pharmacies in 1 and 2½ lb. cans.



DRYCO

Announcing the availability of PERTUSSIS IMMUNE SERUM (*human*) IN VACUUM DRIED FORM

Once again we have Pertussis Immune Serum (human) *in the preferred* vacuum dried form. *Orders from physicians anywhere filled quickly. 24-hour service to handle telegraph orders. For literature and full information, write to:*

The **PHILADELPHIA SERUM EXCHANGE**

A NON-PROFIT ORGANIZATION

1740 Bainbridge Street
Philadelphia 46, Pa.

See the improved Hygeia Nursing Unit

- Easy to clean.
- Fewer parts to handle—just bottle, nipple and cap.
- When bottles are filled, only necessary to remove cap at feeding time.
- Sterilized cap makes handy container for baby's other foods.

CAP . . . Keeps nipple germ-free for storing or out-of-home feeding. Sterilized cap may be used for orange juice, cereals, etc.

NIPPLE . . . Famous breast-shaped nipple has a patented airvent to insure steady flow of formula and reduce "wind-sucking." Sanitary tab keeps nipple sterile when applying. *Not necessary to touch feeding surfaces of nipple.*

BOTTLE . . . Wide mouth—easy to clean—no funnel required for filling. Red measuring scale easy to read. Tapered shape makes it easier for baby to hold.

Sample free to doctors on request.
Sold by druggists everywhere.
Hygeia Nursing Bottle Co., Inc.
1210 Main St., Buffalo 9, N. Y.

AVAILABLE IN 4 OZ. AND 8 OZ. SIZES



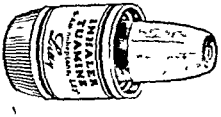
All Hygeia national ads say:
"CONSULT YOUR DOCTOR REGULARLY"

HYGEIA NURSING BOTTLES NIPPLES WITH CAPS
Sold complete as illustrated, or parts separately



as convenient
as your pocket...

Convenience is often a decisive factor in patient co-operation. There are cases, for example, in which the physician desires prolonged and continuous shrinkage of the nasal mucosa. In the course of a busy day, the patient may not find an opportunity to administer Solution 'Tuamine Sulfate' (2-Aminoheptane Sulfate, Lilly) by dropper. Inhaler 'Tuamine' (2-Aminoheptane, Lilly), easily carried in pocket or purse may be used by the patient almost at will. Relatively free from undesirable side-effects, Inhaler 'Tuamine' may be employed as frequently as is necessary to maintain freedom from nasal congestion.





INHALER TUAMINE...

.... for pleasant, prolonged relief from nasal congestion .... relatively free from side-effects.

ELI LILLY AND COMPANY
INDIANAPOLIS 6, INDIANA, U.S.A.

Vol. 31, No. 3, September, 1947. The Journal of Pediatrics is published Monthly by The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo., Subscription price: United States, its possessions, Pan-American Countries, $5.50 a year; Canada, $10.00 (Canadian Currency); Foreign, $9.50. Entered as Second-Class Matter June 29, 1932, at the Post Office at St. Louis, Missouri, under the Act of March 3, 1879. Printed in the U. S. A.



Self-Starters
FROM START TO SIX YEARS OLD

Keep Infants' Feet Strong and Balanced

The old saying—"As the Twig is Bent, the Tree's Inclined" is certainly true, especially when it comes to the care of infants' feet. Many foot ailments experienced in later life can be avoided if proper care is exercised during that important period of development . . . *from start to six years old.* SELF-STARTER Shoes are scientifically designed and constructed to provide "Protected Foot Freedom" throughout this period.

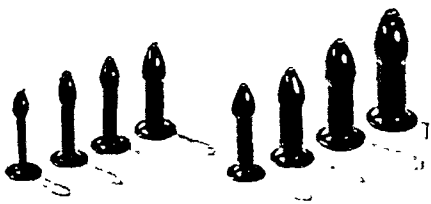
Write today for interesting leaflet and name of nearest experienced fitter.

CARPENTER SHOE CO., ROCHESTER, N. Y.



In CONSTIPATION

YOUNG'S
RECTAL
DILATORS



CHILDREN'S	ADULT'S
4 graduated sizes 0, 1, 1½, and 2	4 graduated sizes 1, 2, 3 and 4

Used by the profession for more than 40 years, Young's Rectal Dilators provide anal dilatation and help to restore normal tone where tight or spastic rectal sphincter muscles have induced a constipated condition. 15 to 30 minutes' daily use tends to promote habit time. Sold only on R.

● Available at ethical drug stores or from your surgical supply house. Write today for complete literature.

F. E. YOUNG & COMPANY
434 E. 75th St. Chicago 19, Ill.



MELORIPE BANANA POWDER

MELORIPE BANANA POWDER is pure ripe banan from which practically all the moisture has bee removed by our exclusive drying process.

MELORIPE BANANA POWDER is used therapeu tically in the treatment of celiac and gastro intestinal disorders as well as in normal infan feeding. It is especially valuable when a hig carbohydrate, low protein and non-irritatin diet is indicated.

MELORIPE BANANA POWDER is now procurabl from most wholesale druggists.

FOOD CONCENTRATES, INC.
Pier 3, North River, New York 6, N. Y.

On Introducing Solid Foods to Infants...

Excerpts from
"THE NEWER NUTRITION IN PEDIATRIC PRACTICE"
by I. Newton Kugelmass B. S., M. A., M. D., Ph D., Sc D.
J. B. Lippincott Company 1940

"EARLY addition of solid food accustoms the infant to new tastes, flavors and consistencies as well as to spoon feeding. There is a decided advantage in developing a general liking for all foods rather than likes and dislikes for specific foods. Solid foods added during the second or third months make for better food habits than when introduced later in infancy. . . . Infants reared on such a regime show more accelerated physical development and more marked resistances to infection. They are actually stronger and more active, with better color and musculature than infants maintained exclusively on milk mixtures. At what age should a mixed diet supplement breast or bottle-feeding? It is not possible to make any definite statement applicable to all infants. Normal babies tolerate gradual introduction of cereals, fruits, vegetables, egg, meat, etc., from the first month until a varied dietary becomes the daily routine by the end of the first year." (*page 272*)

"The tolerance of healthy infants for the common foodstuffs of every day life covers a wider range than is generally realized. Meats, glandular organs, fats, oils, eggs, fruits, vegetables, and cereals as well as milk are well utilized." (*page 278*)

Campbell's Baby Soups Offer an ADVANTAGEOUS Way to Start Babies on Solids

ADVANTAGE: Campbell's Baby Soups are strained foods — smooth semi-solids.

ADVANTAGE: they are *balanced combination foods* that provide all the meat, all the vegetables a baby needs.

ADVANTAGE: they are of a consistency readily tolerated by young babies and may, therefore, be fed to them as their first solids.

ADVANTAGE: they can be used as the main dish of a baby's meal.



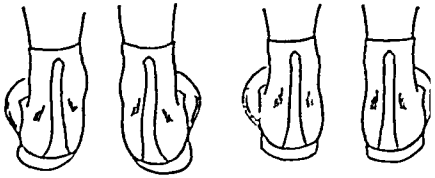
5 KINDS:

CHICKEN COMBINED WITH 5 VEGETABLES AND CEREAL
BEEF COMBINED WITH 6 VEGETABLES AND CEREAL
LAMB COMBINED WITH 5 VEGETABLES AND CEREAL
LIVER COMBINED WITH 7 VEGETABLES AND CEREAL
VEGETABLE — 8 VEGETABLES AND OATMEAL

For chart showing complete list of ingredients and dietetic analysis of each soup, write: Campbell Soup Company, Camden, N. J.

Every grocer who sells Campbell's Soups can supply Campbell's Baby Soups

Helping to correct *Pronation*



Stride-Rite recognizes the problems of pronation to the extent that it builds a special shoe for this purpose alone. An eighth inch wedge is built in on the inner border of all heels as a corrective measure. This is done at the factory with the quality and precision for which Stride-Rite is recognized, providing a solid foundation for any further adjustment.

THE STRIDE RITE SHOE

FROM TOTS TO TEENS



GREEN-SHOE MFG. CO., BOSTON, MASS.

Just Released

A New Mosby *Publication*

INFANT NUTRITION

by PHILIP C. JEANS, M.D., Professor of Pediatrics, College of Medicine, State University of Iowa, and the late WILLIAM McKIM MARRIOTT, M.D., Professor of Pediatrics, Washington University School of Medicine.

After a lapse of several years, this popular text returns to the Mosby list in a new, completely modern Fourth Edition.

Dr. Jeans has revised the text thoroughly—overlooking none of the great strides made in the field of nutrition since publication of the last edition.

Changes and additions have been made in relation to Development; Minerals; the Vitamins and Infant Diseases. There is a comparative analysis of human and cows' milk, with discussion of artificial feeding.

495 Pages 36 Illustrations Price $6.50

The C. V. MOSBY *Company*

SAINT LOUIS SAN FRANCISCO

There he kept her very well...



In the past, vitamin C in solution has been far more difficult to keep than Peter's wife. Indeed a problem . . . until Cecon was developed. Because vitamin C *keeps very well* in Cecon—a stable, concentrated (10%) solution of free ascorbic acid in propylene glycol—*so well* each drop, even the very last in the bottle, contains 2 mg. of ascorbic acid. Cecon affords economical, accurate drop doses of vitamin C at either supplemental or therapeutic levels. It is easily administered in water, milk formulas, or soft foods. Cecon is an Abbott Vitamin Product and fully meets the most exacting requirements for potency and quality. On your next prescription, give your patients this assurance, *specify* Cecon—the reliable and convenient product for prevention or treatment of vitamin C deficiencies in infants and adults. Cecon is available through pharmacies in 10- and 50-cc. bottles, supplied with droppers.

Cecon®

(Solution of Ascorbic Acid 10% w/v in Propylene Glycol, Abbott) Patent Pending

Abbott

ABBOTT LABORATORIES, North Chicago, Illinois

INDEX TO ADVERTISERS

Please mention "The Journal of Pediatrics" when writing to our advertisers—It identifies you

Abbott Laboratories (Tridione) ---- 4
Arlington Chemical Company, The (Arlcaps) ---- 10
Armstrong Company, The Gordon (Baby Incubators) ---- 3
Articles to Appear in Early Issues ---- 52
Ayerst, McKenna & Harrison Limited (Enziflur Lozenges) ---- 27

Beech-Nut Packing Company (Baby and Junior Foods) ---- 9
Bischoff Company Inc., Ernst (Aminet Suppositories) ---- 35
Borden's Prescription Products (Dryco) ---- Fourth Cover
Borden's Prescription Products (Mull Soy) ---- 53
Breck, Inc., John H. (Baby Breck Ointment) ---- 49
Burroughs Wellcome & Co. (U. S. A.) Inc. (Dexin) ---- 42
Burroughs Wellcome & Co. (U. S. A.) Inc. (Ryzamin-B) ---- 55

Campbell Cereal Company (Malt-o-Meal) ---- 16
Campbell Soup Company (Baby Soups) 2
Carpenter Shoe Company (Self-Starters) 59
Cutter Laboratories (Dermesthetic Ointment) ---- 40

Dennison (Diaper Liners) ---- 56
Doho Chemical Corporation (Auralgan and Otosmosan) ---- 31
Donley Evans & Company (Gluco-Sulfonamides) ---- 11

Food Concentrates, Inc. (Meloripe Banana Powder) ---- 59

Gerber Products Company (Baby Foods) 23
Great Atlantic and Pacific Tea Company, The (White House Evaporated Milk) -- 25
Green Shoe Mfg. Co. (Stride-Rite) ---- 61

Heinz Company, H. J. (Strained Applesauce) ---- 24
Hoffmann-La Roche Inc. (Vi-Penta Drops) ---- 37
Hygeia Nursing Bottle Co., Inc. (Nursing Unit) ---- 57

International Pharmaceutical Corporation (Glycerite of Hydrogen Peroxide) 19

Johnson & Johnson (Baby Powder) ---- 5
Junket Folks, The (Rennet) ---- 15

Kinney & Sons, Inc., H. W. (Cartose) -- 50
Knox Gelatine (Gelatine) ---- 32

Lederle Laboratories, Inc. (Cerevim) -- 33
Libby, McNeill & Libby (Homogenized Baby Foods) ---- 43
Lilly and Company, Eli (Diphtheria and Tetanus Toxoids) ---- Second Cover

M & R Dietetic Laboratories, Inc. ---- (Similac) ---- 6

Marcelle Cosmetics, Inc. (Hypo-Allergenic Cosmetics) ---- 36
Massengill Company, The S. E. (Morruguent and Morumide Ointment) ---- 22
Mead Johnson & Company (Dextri-Maltose) ---- 64
Mead Johnson & Company (Pabena and Pablum) ---- 1
Mennen Baby Oil and Powder ---- 14
Merck & Co., Inc. (Pyridium) ---- 48
Merrell Company, The Wm. S. (Infa-Concemin) ---- 17

National Confectioners' Association (Council on Candy) ---- 38
National Dairy Products Company, Inc. (Formulac) ---- 45
National Drug Company, The (Diphtheria-Tetanus Pertussis Combined) ---- 41
Nestlé's Milk Products, Inc. (Lactogen and Dextrogen) ---- 54

Parke, Davis & Company (Benadryl Hydrochloride) ---- 7
Pet Milk Company (Evaporated Milk) -- 51
Philadelphia Serum Exchange, The (Pertussis Immune Serum-Human) ---- 57

Ralston Purina Company (Ralston) ---- 34

Schenley Laboratories, Inc. (Penicillin) 30
Schering Corporation (Progynon-B) ---- 21
Smith, Kline & French Laboratories (Exkadiazine) ---- 46
Staley Mfg. Co., A. E. (Sweetose) ---- 8
Stearns & Company, Frederick (Neo-Synephrine) ---- 13
Stork Baby Products (Castile Soap) ---- 56
Swift & Company (Strained and Diced Meats) ---- 47

Tarbonis Company, The (Tarbonis) ---- 39

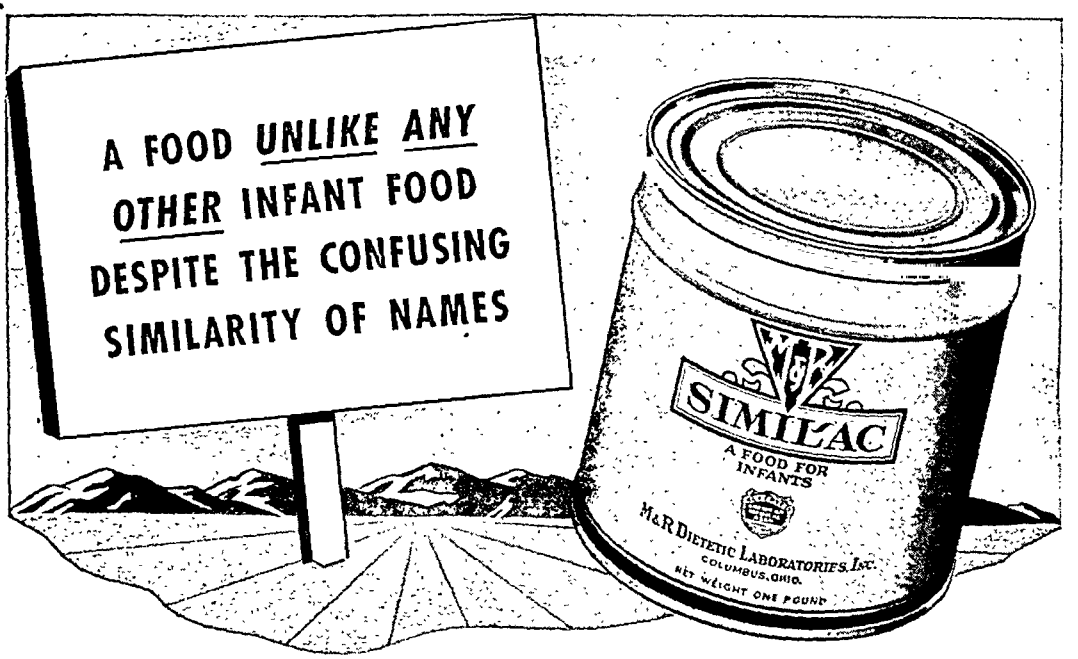
U. S. Savings Bonds ---- 60

Vaisey Shoe Co., Inc., S. B. (Jumping-Jacks) ---- 44

Walker Vitamin Products, Inc. (Multi-drops) ---- 26
Westwood Pharmacal Corp. (Lowila) -- 18
White Laboratories, Inc. (Multi-Beta Liquid) ---- 28, 29
Winthrop Chemical Company, Inc. (Drisdol) ---- 12
Wyeth Incorporated (Soyola) ---- 20

Young & Co., F. E. (Dilators) ---- 59

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.



THE FAT of Similac is not all butter fat, but a homogenized combination of fats that is balanced chemically and metabolically to the infant's requirements.

THE PROTEIN of Similac is rendered soluble to a point approximating the soluble protein in human milk.

THE CARBOHYDRATE in Similac is lactose.

THE MINERALS in Similac are adjusted to closely approximate the minerals of breast milk.

THE CURD TENSION of Similac is the same as that of breast milk—consistently zero.

No other substitute resembles breast milk in all of these essential respects.

M & R DIETETIC LABORATORIES, INC. • COLUMBUS 16, OHIO

ACCEPTED AMERICAN MEDICAL ASSN

A powdered, modified milk product, especially prepared for infant feeding, made from tuberculin tested cow's milk (casein modified) from which part of the butter fat has been removed and to which has been added lactose, cocoanut oil, cocoa butter, corn oil, and olive oil. Each quart of normal dilution Similac contains approximately 400 U.S.P. units of Vitamin D and 2500 U.S.P. units of Vitamin A as a result of the addition of fish liver oil concentrate.

SIMILAC

Similar to breast milk

CONTENTS FOR AUGUST, 1947

Original Communications

The Ulcerated Urethral Meatus in Male Children. Paul Freud, M.D., New York, N. Y. ---- 131
Sex Precocity and the Adrenogenital Syndrome. Beatrice Bergman, M.D., New York, N. Y. ---- 142
Serum Precipitable Iodines in Recognition of Cretinism and in Control of Thyroid Medication. Evelyn B. Man, Ph.D., Charles S. Culotta, M.D., Dorothy A. Siegfried, B.S., and Carter Stilson, M.D., New Haven, Conn. ---- 154
The Determination of Status and Progress in Children With Nutritive Failure. Arvin W. Mann, D.D.S., Samuel Dreizen, D.D.S., and Tom D. Spies, M.D., Birmingham, Ala., With the Technical Assistance of S. Idell Pyle, M.S., Cleveland, Ohio ---- 161
Further Observations on Post-Tracheotomy, Mediastinal Emphysema, and Pneumothorax. Gilbert B. Forbes, M.D., St. Louis, Mo., George Salmon, M.D., Houston, Texas, and John C. Herweg, M.D., St. Louis, Mo. ---- 172
A Study of the Absorption and Excretion of Oral Penicillin in Children. Milton Markowitz, M.D., and Ann G. Kuttner, M.D., Irvington-on-Hudson, N. Y. ---- 195
Self-Demand Feeding and Indulgence in Early Infancy. Gustave F. Weinfeld, Highland Park, Ill. ---- 203
Method of Holding the Head for Scalp Vein Transfusions and Restraining the Legs for Intravenous Therapy. Peter H. Spohn, M.D., and Taylor Statten, M.D., Toronto, Ont. ---- 207
Erratum ---- 210

Case Reports

Idiopathic Dilatation of the Common Bile Duct in Childhood. Weston M. Kelsey, M.D., Winston-Salem, N. C. ---- 211
Impetigo Neonatorum Congenita. Abraham Gilner, M.D., and Irving Nelson, M.D., Brooklyn, N. Y. ---- 213
Congenital Desmoid of the Abdominal Wall. David Dean Brockman, M.D., Durham, N. C. ---- 217
Lipochondrodystrophy (Gargoylism). M. E. Lahey, M.D., R. D. Lomas, M.D., and T. C. Worth, M.D., Houston, Texas ---- 220
Herniated Ovary in an Infant. Norman Duren, M.D., F.A.C.S., and S. Rosa Frank, M.D., Beaumont, Texas ---- 227

The Social Aspects of Medicine

A Submission Respecting Health Insurance. By the Canadian Medical Association, April, 1943 ---- 228

Report of Meeting

The Fifth International Congress of Pediatrics ---- 242

News and Notes

News and Notes ---- 246

Book Reviews

Book Reviews ---- 247

Editor's Column

The Canadian Medical Association and Health Insurance ---- 249
The Fifth International Congress of Pediatrics ---- 250

Sweetose*

—an ideal carbohydrate supplement for infant feeding

A new and patented syrup made from corn under strict laboratory control

Sweetose offers the physician a modern carbohydrate supplement which is a considerable improvement over traditional corn syrups. Made from hydrolized corn starch by the new acid-enzyme process, Sweetose is ideal in many ways for infant feeding:

Sweetose provides a higher content of both dextrose and maltose over older types of corn syrup.

Sweetose is well tolerated, easily digested and absorbed. The possibility of gastro-intestinal upset is minimized.

Sweetose is pasteurized.

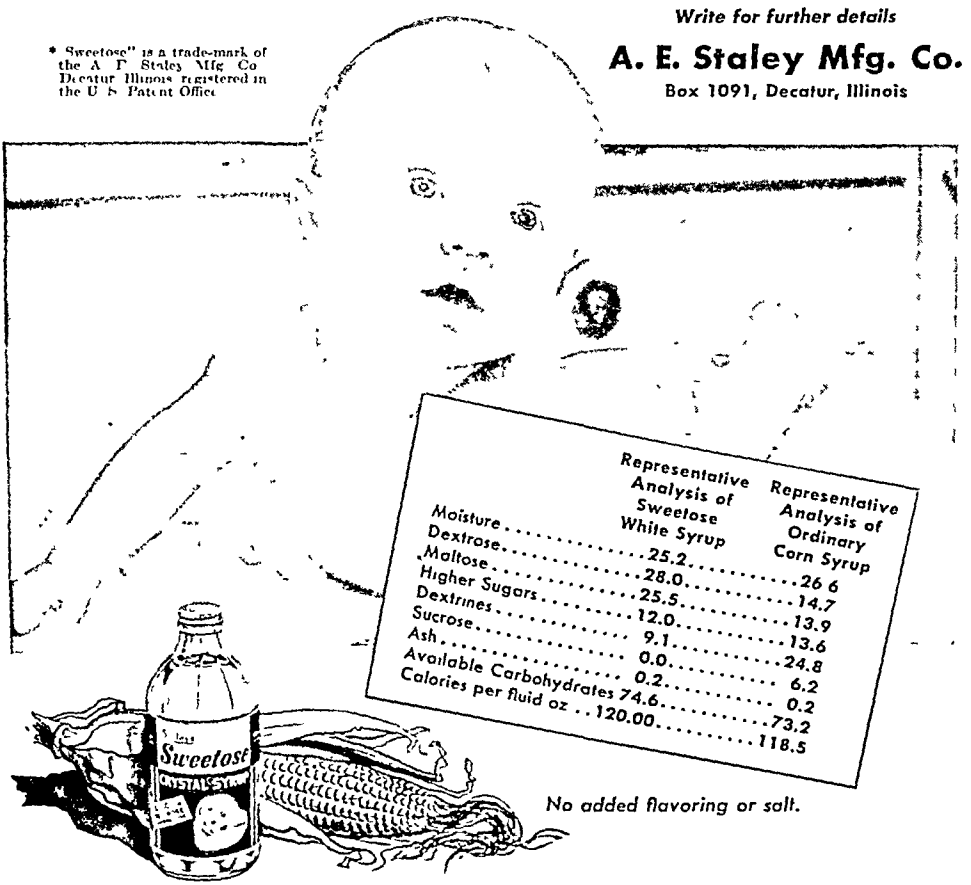
Sweetose is easy for mothers to use. Of low viscosity, it dissolves readily in milk or water at refrigerator temperatures, thus avoiding the stimulation of bacterial growth.

Write for further details

A. E. Staley Mfg. Co.

Box 1091, Decatur, Illinois

* Sweetose" is a trade-mark of the A E Staley Mfg Co Decatur Illinois registered in the U S Patent Office



	Representative Analysis of Sweetose White Syrup	Representative Analysis of Ordinary Corn Syrup
Moisture	25.2	26 6
Dextrose	28.0	14.7
Maltose	25.5	13.9
Higher Sugars	12.0	13.6
Dextrines	9.1	24.8
Sucrose	0.0	6.2
Ash	0.2	0.2
Available Carbohydrates	74.6	73.2
Calories per fluid oz	120.00	118.5

No added flavoring or salt.

Vol. 31 SEPTEMBER, 1947 No. 3

THE JOURNAL OF PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE PROBLEMS AND DISEASES OF INFANCY AND CHILDHOOD

BORDEN S. VEEDER
St. Louis
Editor

Published by THE C. V. MOSBY COMPANY, 3207 Washington Blvd., St. Louis 3, U.S.A.
Copyright 1947 By The C. V. Mosby Company

Table of Contents on 3rd Cover

ARLCAPS* now available in 2 forms—for TANDEM ACTION



ARLCAPS, long a prescription favorite for securing rapid symptomatic relief of hay fever and asthma, is now presented in two forms:

ARLCAPS — **Uncoated**

For rapid effectiveness; provides gratifying quick relief when needed.

ARLCAPS — **Enteric Coated**

BRAND OF PHENEPHATRATE

For delayed action; prolongs symptomatic relief afforded by the uncoated capsule.

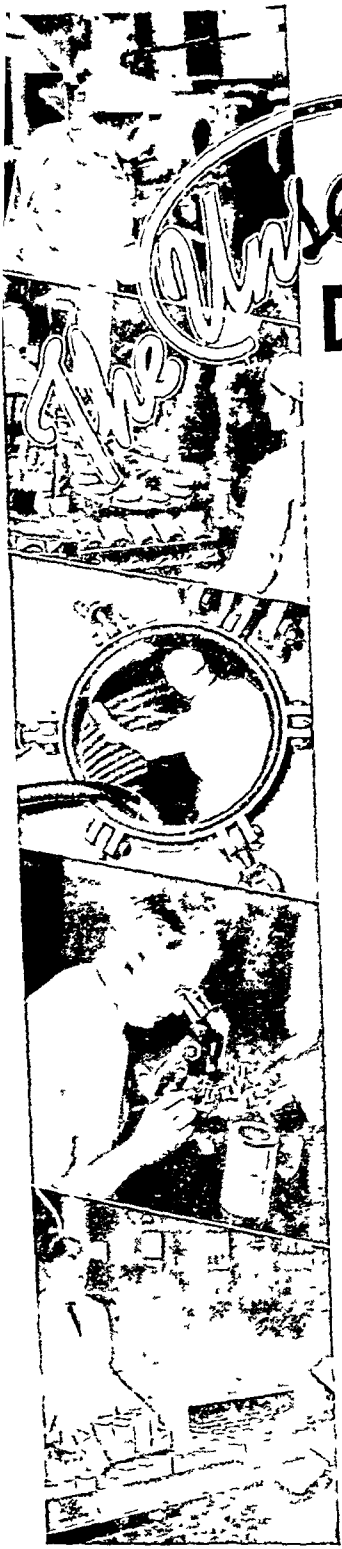
Combined for Tandem Action

Night-long benefit may be secured by simultaneous ingestion of 1 capsule and 1 enteric-coated tablet—the effects of the enteric-coated tablet becoming manifest during the night, thus extending the relief afforded by the capsule.

Both types supplied: 3-grain size—in bottles of 35 and 500; 5-grain size—in bottles of 25 and 500.

*The word ARLCAPS is a registered trademark of The Arlington Chemical Company.

Arlington THE ARLINGTON CHEMICAL COMPANY • YONKERS 1, NEW YORK



The Unseen Quality of DEXTRI-MALTOSE

DEXTRI-MALTOSE is no ordinary carbohydrate. Step by step, its manufacture is surrounded with every care and precaution, evolved through long years of experience and research. Unseen by physician and patient are numerous safety factors, the practical effect of which nevertheless is present in every package of Dextri-Maltose. To name a few of these:

1. Dextri-Maltose is sampled for bacteriological testing before drying.
2. Steam under pressure sterilizes Dextri-Maltose filter presses which remove proteins, fat and indigestible residue.
3. Blood agar tests are made to insure absence of hemolytic cocci.
4. Bacteriological tests are made in a steam-washed plating room, the air of which is filtered.
5. Dextri-Maltose containers are automatically filled and closed without human handling of the product.
6. The direct microscopic test which Dextri-Maltose receives is but one microbiological test which it must routinely meet.
7. The interiors of the large converters in which Dextri-Maltose is processed are thoroughly scrubbed prior to steam sterilization.
8. Steaming under pressure sterilizes the converters for processing Dextri-Maltose.
9. After being packaged, Dextri-Maltose is held in storage and released only after final approval from the bacteriological checking laboratory.
10. Portable equipment used in manufacturing Dextri-Maltose is sterilized in autoclaves under steam pressure.
11. Dextri-Maltose is tested routinely to check the keeping quality of prepared feedings held in refrigeration for 24 hours.

It is, therefore, no mere coincidence that Dextri-Maltose enjoys greater pediatric acceptance today than ever before. By constant research and everlasting watchfulness, we try to keep pace with pediatric progress, and we put forth every human effort to merit the continued respect and confidence of the medical profession.

The True Measure of Economy Is Value

SANITARY CONTROL OF DEXTRI-MALTOSE
No. 7 OF A SERIES

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons. Mead Johnson & Company Evansville 21 Indiana, U.S.A.

Why do Sally, Irene and Mary need vitamin D ?

Growing children require vitamin D mainly to prevent rickets. They also need vitamin D, though to a lesser degree, to insure optimal development of muscles and other soft tissues containing considerable amounts of phosphorus . . . Milk is the logical menstruum for administering vitamin D to growing children, as well as to infants, pregnant women and lactating mothers. This suggests the use of Drisdol in Propylene Glycol, which diffuses uniformly in milk, fruit juices and other fluids.

Average daily dose for infants 2 drops, for children and adults 4 to 6 drops, in milk. Available in bottles of 5, 10 and 50 cc. with special dropper delivering 250 U.S.P. units per drop.



DRISDOL IN PROPYLENE GLYCOL

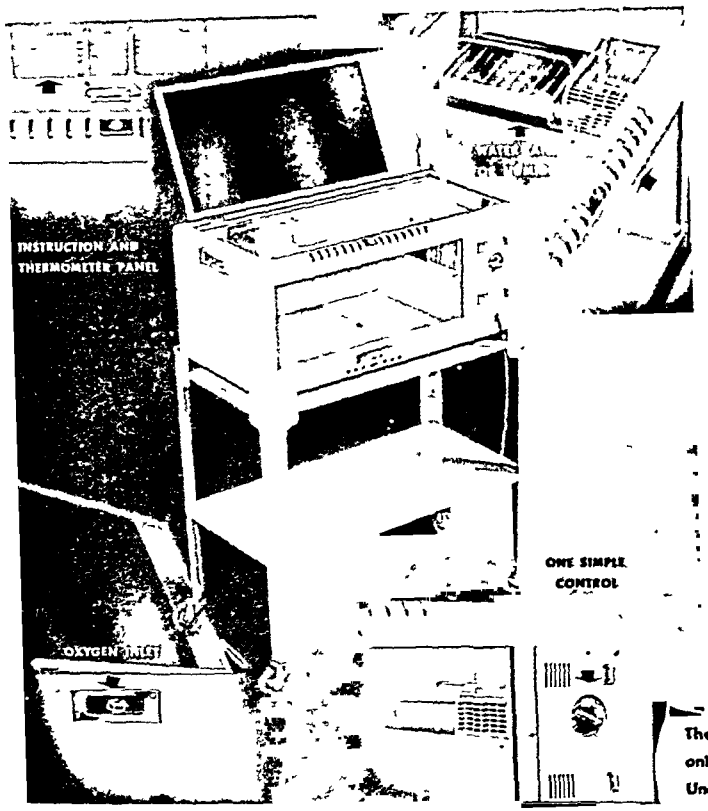
MILK DIFFUSIBLE VITAMIN D PREPARATION
ODORLESS • TASTELESS • ECONOMICAL

DRISDOL, trademark Reg U S Pat Off & Canada, Brand of Crystalline Vitamin D_2 (calciferol) from ergosterol

Winthrop CHEMICAL COMPANY, INC.

Pharmaceuticals of merit for the physician • New York 13, N. Y. • Windsor, Ont.

ARMSTRONG X-4 PORTABLE BABY INCUBATOR



1. Low cost
2. Underwriter approved
3. Simple to operate
4. Only 1 control dial
5. Safe, low-cost, heat
6. Easy to clean
7. Quiet and easy to move
8. Ball-bearing, soft rubber casters
9. Fireproof construction
10. Excellent oxygen tent
11. Welded steel construction
12. 3-ply safety glass
13. Full length view of baby
14. Simple outside oxygen connection
15. Night light over control
16. Both F. and C. thermometer scales
17. Safe locking ventilator
18. Low operating cost
19. Automatic control
20. No special service parts
21. Lid locks open

The Armstrong X-4 Baby Incubator is the only Baby Incubator tested and approved by Underwriters' Laboratories for use with oxygen.

● In offering you the Armstrong X-4 Portable Baby Incubator we stand firmly on the principle that we must provide a SAFE Baby Incubator, a LOW COST Baby Incubator and a SIMPLE Baby Incubator.

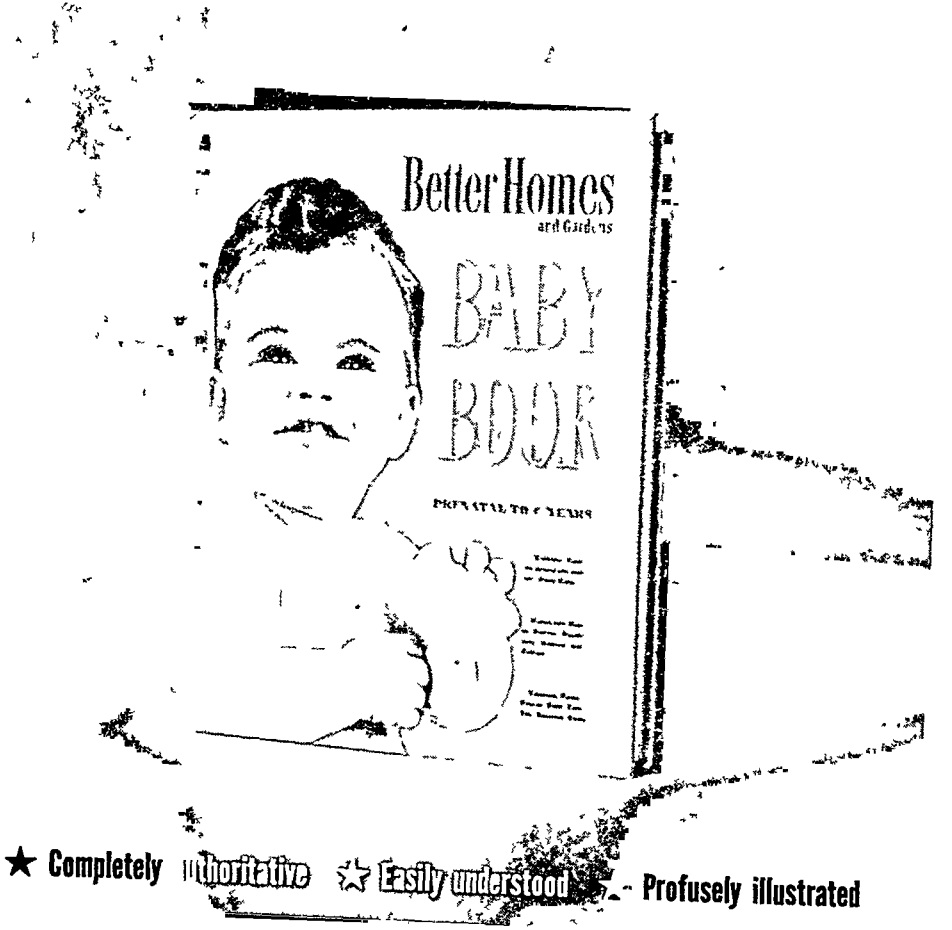
That we have succeeded is evidenced by the fact that to date close to 400 Hospitals have placed voluntary repeat orders for more than 1200 additional Incubators. More and more it is being used, not only for the premature baby, but for any debilitated or under weight baby.

THE GORDON ARMSTRONG COMPANY

Division PPI • Bulkley Building • Cleveland 15, Ohio

Distributed in Canada by INGRAM & BELL, LTD. • TORONTO • MONTREAL • WINNIPEG • CALGARY • VANCOUVER

Export Distribution by GENERAL ELECTRIC MEDICAL PRODUCTS CO. • CHICAGO 3, ILLINOIS



The Book That Saves Professional Time

So many Pediatricians save their professional time by recommending the Better Homes & Gardens Baby Book to mothers, especially new mothers.

For the BH&G Baby Book gives mothers authentic information and guidance on many routine matters that would otherwise take unnecessary time and attention of the Pediatrician himself. It covers from prenatal to 6 years, with adequate space for recording development from first to eighteenth year.

The BH&G Baby Book was prepared under the guidance of two of America's eminent pediatricians. In its review, the "Journal of Pediatrics" called it "an excellent book with sound advice, attractively presented, and in keeping with present-day thinking."

The Better Homes & Gardens Baby Book has already proved its value to more than 500,000 mothers —and their medical advisers. It may be purchased at book dealers and infants' shops. If you would like a copy for your own use, have your secretary write for special professional price. Address,

Better Homes & Gardens, Des Moines, Iowa

OVER 1000 HOSPITALS ADOPT LOTION CARE FOR NEWBORNS

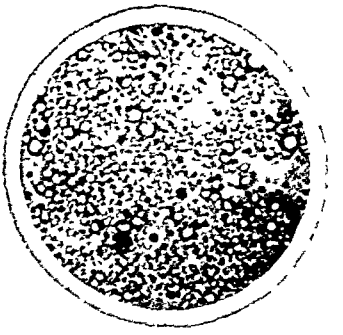


EVERY MONTH, more and more hospital nurseries are changing to a modern improvement in infant skin care—Johnson's Baby Lotion.

This new, white, antiseptic Lotion is used just like baby oil, for routine inunction. It is proving unusually effective in the prevention of common skin irritations.

Hospital tests on thousands of newborns have shown that Johnson's Baby Lotion care lowers the incidence of miliaria (which often leads to more serious secondary infections) by impressive percentages.

Johnson's Baby Lotion leaves discontinuous film. Note micron-size oil globules. (1000 x)



Lotion Leaves Discontinuous Film

Johnson's Baby Lotion is a homogenized emulsion of pure selected mineral oil and water, with lanolin and an antiseptic added.

When applied to the infant's skin, the Lotion leaves a discontinuous film of micron-size oil globules, as the water phase evaporates. This permits normal heat radiation and allows perspiration to escape readily, thus lessening the danger of irritation.



JOHNSON'S BABY LOTION

ANTISEPTIC

Johnson & Johnson

FREE! Mail coupon for 12 distribution samples!

Send for sample bottles of Johnson's Baby Lotion
Johnson & Johnson, Baby Products Division
Dept. 63, New Brunswick, N. J.

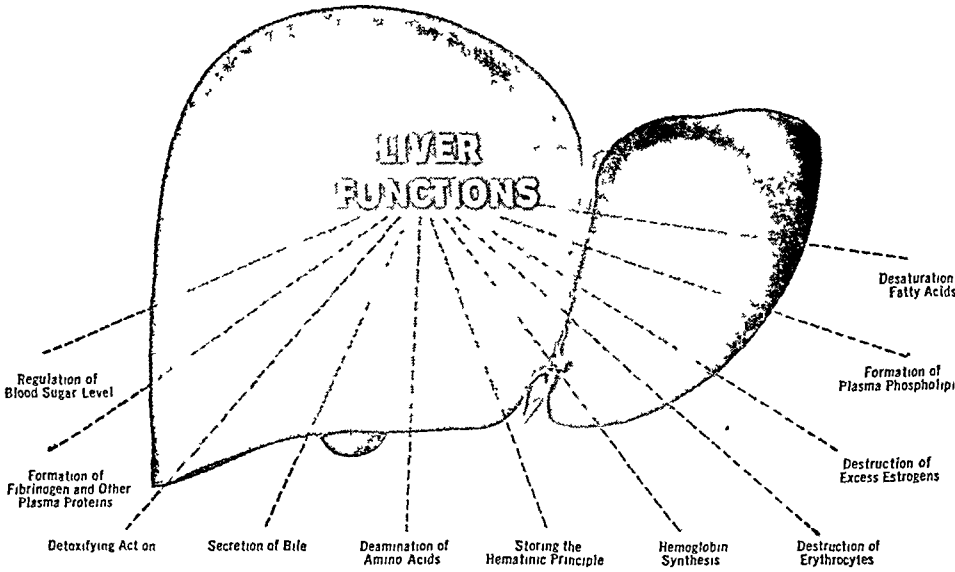
Please send me, free of charge, 12 distribution samples of Johnson's Baby Lotion.

Name_____

Street_____

City_____ State_____

Offer limited to medical profession in U.S.A.



To Guard the Functional Integrity of the LIVER

The complex nature of the manifold functions of the liver is reflected in the diagram shown above. To maintain its functions in an efficient manner, the liver must be adequately protected against toxic influences. Parenchymatous damage with ensuing decreased functional capacity can lead to severe metabolic derangements.

Protein deficiency is an important factor in precipitating impaired liver function. Hence an adequate intake of biologically complete protein, ordinarily in the form of protein foods, is indispensable as a safeguard of liver competency.

Among man's protein foods, meat ranks high not only because of its generous content of protein, but also because its protein is complete, capable of satisfying all protein requirements. Furthermore, all meat is 96 to 98 per cent digestible.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association

AMERICAN MEAT INSTITUTE
MAIN OFFICE, CHICAGO . . . MEMBERS THROUGHOUT THE UNITED STATES



there's an

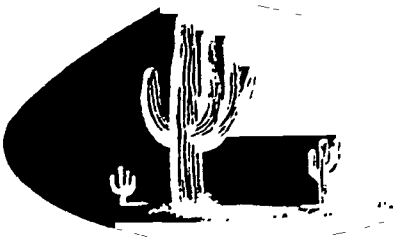




economical



alternative



BENADRYL may frequently afford an economical alternative to long journeys to expensive resorts in "pollen-free" areas.

It is now established that the symptoms of anaphylaxis are usually the result of an excessive amount of histamine in the tissues. By antagonizing this substance, BENADRYL frequently renders the patient free of the symptoms of allergy. From 25 to 50 mg. are usually sufficient to produce relief.

BENADRYL (diphenhydramine hydrochloride) is available in Kapseals® of 50 mg. each, in capsules of 25 mg. each, and as a palatable elixir containing 10 mg. in each teaspoonful.

ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MEDICAL ASSOCIATION

Benadryl®
hydrochloride

PARKE DAVIS & COMPANY, DETROIT 32 MICHIGAN

In INFANTILE ECZEMAS and DIAPER RASH

When Baby cannot tolerate

SOAP



LOWILA

for DIAPER RASH and Infantile Eczema due to or aggravated by soap

COMPLETELY SOAPLESS, NON-IRRITANT EFFICIENT SKIN CLEANSING

LoWILA* Cake

Superbly mild, lathering detergent; no alkali; correct pH; less slippery, therefore, allows firmer hold on baby in bath. NEW 6-oz. cake more convenient, more economical.

Advertised in American Medical Association Publications

LoWILA Liquid

Washes diapers beautifully, gently, without the irritating residue left by soaps. Very economical.

Mother's skin, too, will appreciate **LoWILA**

*T.M. Reg. U.S. Pat. Off.

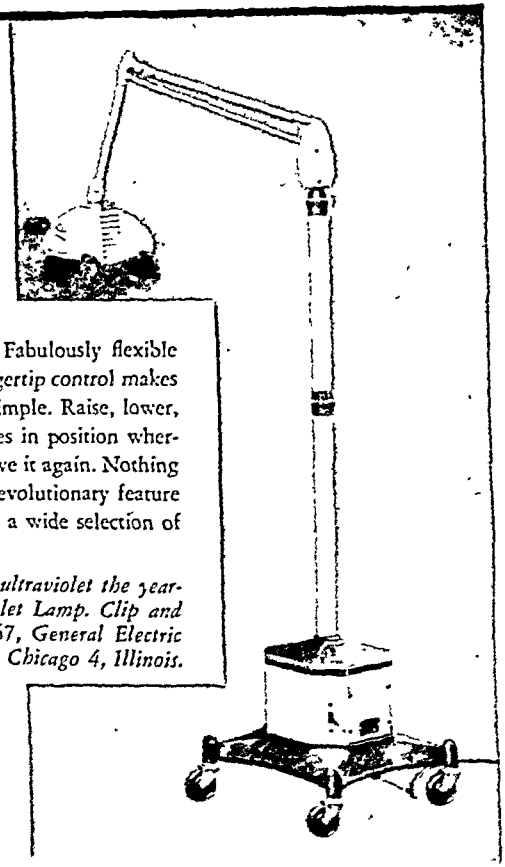
WRITE FOR SAMPLE AND LITERATURE

Westwood PHARMACAL CO., INC.

468 DEWITT ST., BUFFALO 13, N.Y.

G-E X-RAY PROUDLY ANNOUNCES
THE NEWEST ADDITION TO THE FAMILY

The G-E Prescription Model Ultraviolet Lamp offering you all the famous G-E X-Ray quality and service in a new low cost ultraviolet lamp.

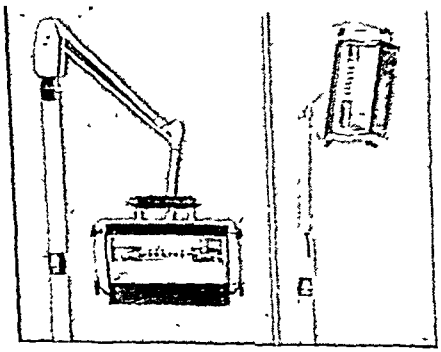


This new, economically priced lamp features the famous G-E Uviarc high pressure mercury quartz burner—economical to operate and with emission characteristics covering the full range of therapeutic ultraviolet. Long familiar to users of G-E professional type lamps, the Uviarc burner emits intense, uniform radiation throughout the spectral bands of proven clinical value.

The compact, sturdily constructed burner housing is mounted on the Dazor Floating Arm. Fabulously flexible and almost human, this remarkable arm with its fingertip control makes the positioning of the lamp amazingly swift and simple. Raise, lower, swing the burner housing through an arc; it freezes in position wherever you stop it—and it stays there too until you move it again. Nothing to tighten, no time consuming adjustments. This revolutionary feature facilitates rapid positioning of the lamp and offers a wide selection of treatment distances.

Plan now to offer your patients the benefits of ultraviolet the year-round with the G-E Prescription Model Ultraviolet Lamp. Clip and mail the convenient coupon today to: Dept. 2667, General Electric X-Ray Corporation, 175 West Jackson Boulevard, Chicago 4, Illinois.

GENERAL ELECTRIC X-RAY CORPORATION



By Please send me detailed information on your new Prescription Ultraviolet Lamp.

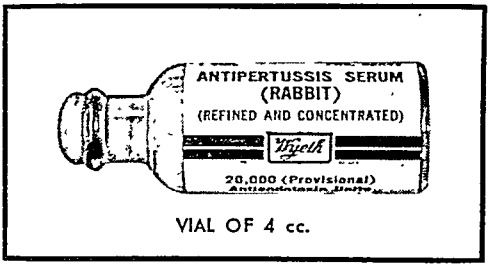
Name_____

Address_____

City_____

State or Province_____

2667



VIAL OF 4 cc.

A Long Step Forward

in the *Specific Treatment* of whooping cough

ANTIPERTUSSIS SERUM (Rabbit)

WYETH

HIGHLY CONCENTRATED...PRECISELY STANDARDIZED

Each dose...4 cc. ...contains therapeutic concentrations of antibodies and not less than 20,000 units of antiendotoxin.

Inhibits growth of Haemophilus pertussis and neutralizes its endotoxin...Imparts a temporary immunity to contacts, modifies and shortens the active disease . . . Tends to prevent complications.

PERTUSSIS ENDOTOXOID-VACCINE Wyeth, for active immunization, contains 15 billion killed H. pertussis and 140 provisional units of pertussis endotoxin per cubic centimeter, converted to endotoxoid.
The endotoxoid component stimulates production of antiendotoxin, and the vaccine content provides antibacterial factors against the invading organism itself.

Pertussis Endotoxoid-Vaccine
Wyeth
Vials of 6 and 24 cc.

WYETH INCORPORATED Wyeth PHILADELPHIA 3, PA.



NOWHERE MORE STRIKING

GLUCO-SULFADIAZINE, in liquid form for oral use, is an ideal chemotherapeutic addition to the armamentarium against disease, especially in the treatment of diseases of children.

Striking results have been reported on the use of Sulfadiazine[1,2] in the treatment of acute diarrhea in children, especially the *Shigella* group. Since acidosis and dehydration accompany acute diarrheal diseases, GLUCO-SULFADIAZINE provides a basis for the intelligent use of a sulfonamide because it contains a *Sodium Lactate-Glucose* base in sufficient amount to maintain alkalinity.



For safer sulfonamide medication, rely on Donley-Evans' GLUCO-SULFONAMIDES—more rapid absorption; higher blood concentrations (than tablet form); positive dosage (eliminate overdosing or underdosing); ease of administration; exceptional palatability.

1. Watt, J., and Gutelius, M.: New Orleans M. & S. J. 99: 266, 1946.
2. Hardy, A. V.: Public Health Repts. 61: 857, 1946.

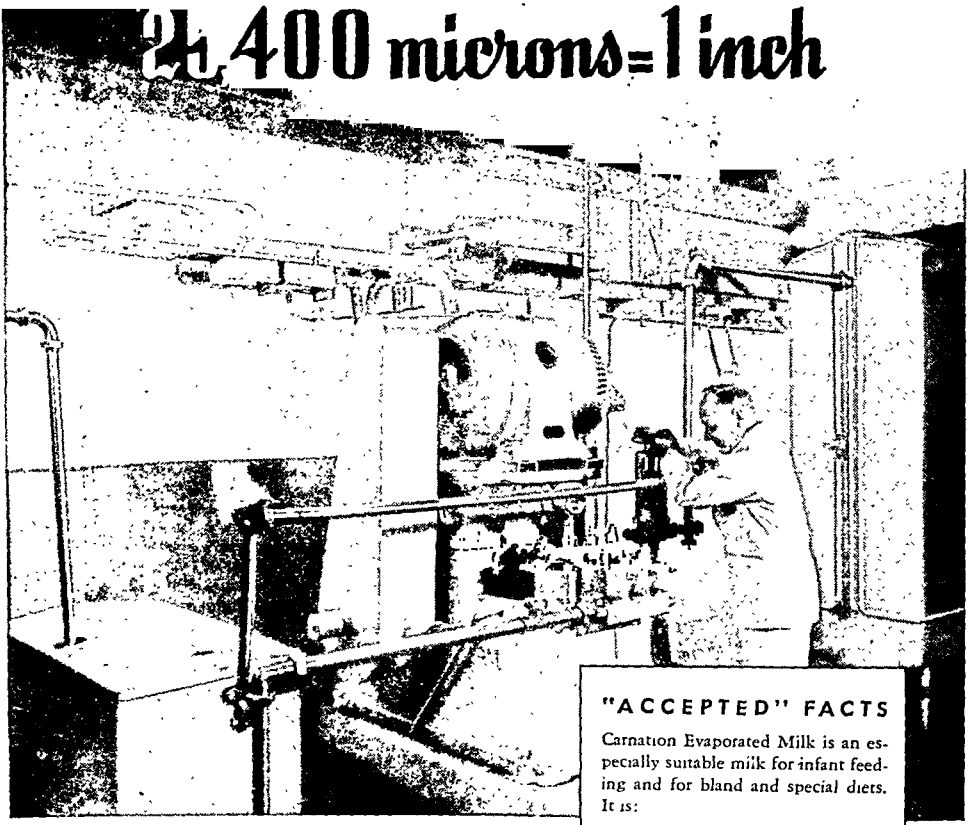
Literature on request.



GLUCO-SULFADIAZINE
GLUCO-SULFATHIAZOLE
GE
GLUCO-SULFAMERAZINE
GLUCO-SULFANILAMIDE

DONLEY-EVANS & COMPANY
ST. LOUIS 20, MISSOURI

24,400 microns=1 inch



GENERATING a pressure mounting as high as 3000 pounds per square inch, this Carnation homogenizer forces the milk through almost invisible apertures. The original large butterfat globules are pulverized to a size of 1 to 3 microns, and evenly dispersed throughout the milk. This renders the butterfat more readily assimilable and brings uniformity to the formula in which this good milk is used. . . . Yet this is merely one of many scientifically controlled processes that contribute to the recognized value of Carnation Evaporated Milk for infant feeding and special dietary uses.

"ACCEPTED" FACTS

Carnation Evaporated Milk is an especially suitable milk for infant feeding and for bland and special diets. It is:

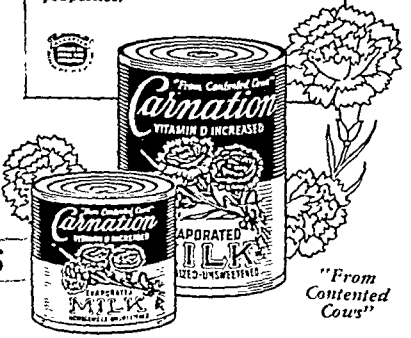
HEAT-REFINED—forming fine, soft, flocculent, low-tension curds.

HOMOGENIZED—with butterfat minutely subdivided for easy assimilation.

FORTIFIED—containing pure crystalline vitamin D_3, 400 U.S.P. units per pint.

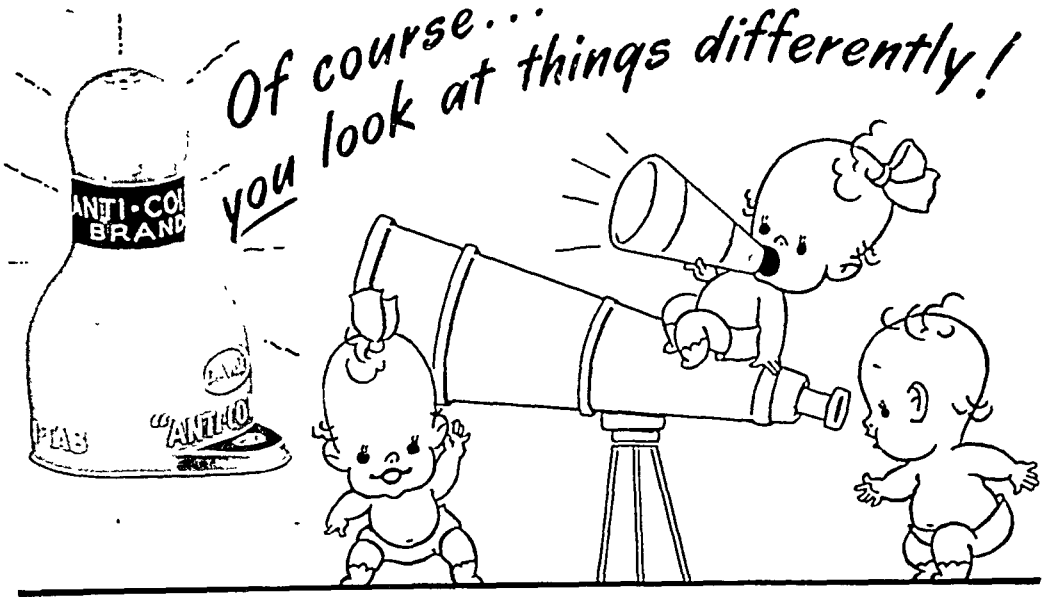
STANDARDIZED—for uniformity in fat and total solids content.

STERILIZED—after hermetic sealing, insuring bacteria-free safety and markedly diminished allergenic properties.



the Milk EVERY DOCTOR KNOWS

"From Contented Cows"



YOU DOCTORS AND NURSES don't see babies as other people do. You see us years from now . . . when your care has helped make us healthy men and women.

And that explains your concern with little things . . . explains why so many of you recommend Davol "Anti-Colic" brand nipples. For Davol nipples help us babies grow up with healthy, well-formed mouths. That's because Davol nipples copy nature.



See their **DESIGN.** Like the maternal nipple, Davol nipples have a short tip and firm, sloping shoulder.

Note their **ACTION.** The Davol design helps promote the lively sucking exercise babies need to develop a healthy mouth, jaw and tongue.



Check their **TIMING.** Most babies get the recommended 20 minutes of sucking action each feeding, when using Davol nipples.



AND DON'T OVERLOOK the return of Davol nursing-bottle caps, to keep prepared formulas sterile.



DAVOL

DAVOL RUBBER COMPANY
PROVIDENCE 2
RHODE ISLAND

For your free copy of the treatise, BOTTLE FEEDING IN RELATION TO INFANTILE COLIC AND MALFORMATION OF THE MOUTH, write Dept. JP7-9.

Full Of Flavor For Toddlers—

Heinz Pineapple Rice Pudding



Tasty, Custard-Rice Pudding Enriched with Delicious Hawaiian Pineapple

TODDLERS like the flavor, color and texture of these Heinz Junior Foods, too — Chicken Farina Vegetable Porridge, Apricot and Apple Sauce and smooth, inviting Creamed Tomato and Rice!

WHEN the babies in your care are ready for Junior Foods, consider including Heinz Pineapple Rice Pudding among their desserts! Rich with cream, eggs and bits of pineapple, it's chopped to a particle size that encourages chewing and at the same time minimizes the danger of baby's choking! Your young patients will enjoy Heinz Pineapple Rice Pudding!

HEINZ
PINEAPPLE
RICE
PUDDING
57 VARIETIES
MADE BY
H. J. HEINZ COMPANY

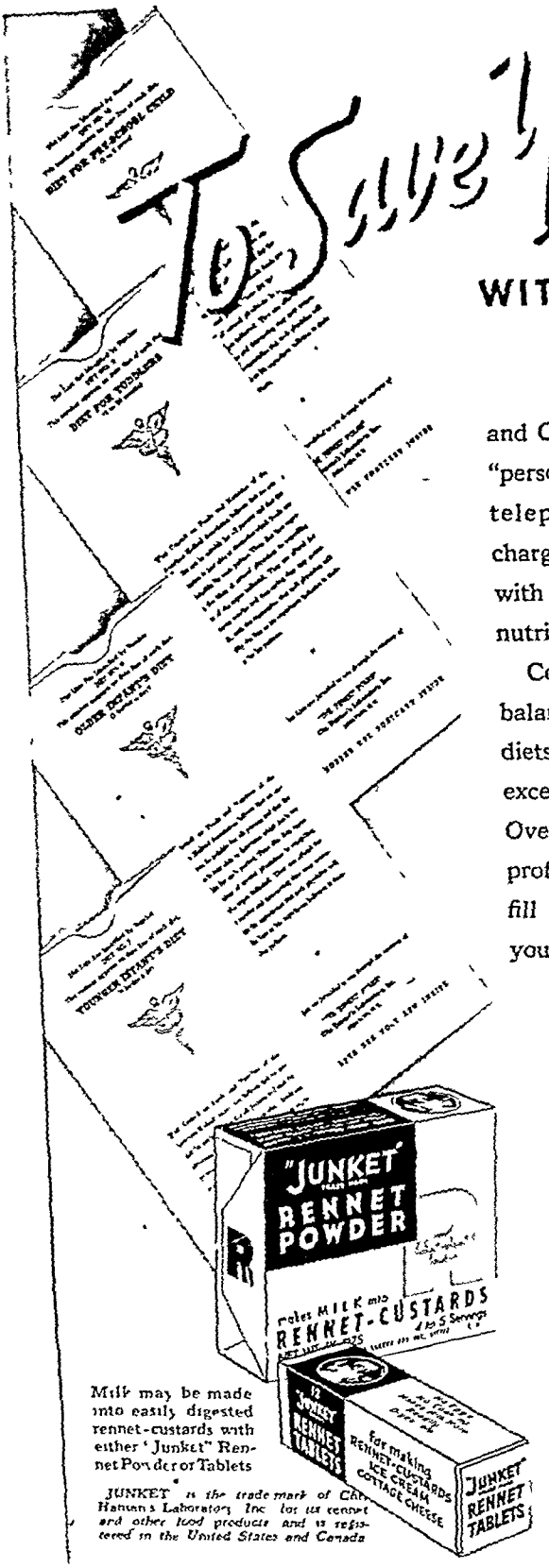
A 78-Year Reputation Backs the Complete Line of

Heinz Baby Foods

CEREALS • FRUITS • VEGETABLES
MEAT FOOD PRODUCTS • DESSERTS

To Save Your Time

WITH PEDIATRIC DIETS!



Milk may be made into easily digested rennet-custards with either 'Junket' Rennet Powder or Tablets

JUNKET is the trade mark of Chr. Hansen's Laboratory, Inc. for its rennet and other food products and is registered in the United States and Canada

THE SERIES OF FOUR Infants' and Children's diet lists which are available "personalized" with your name, address and telephone number (absolutely without charge or obligation) have been prepared with the advice of experts in the fields of nutrition and pediatrics.

Containing full details as to well-rounded, balanced daily menus, physicians find the diets prepared by "Junket" Brand Foods exceedingly useful, flexible and time-saving. Over 8 million have been requested by the profession in the past few years. Won't you fill out the coupon to receive samples for your inspection?

"JUNKET" BRAND FOODS
Division of
Chr. Hansen's Laboratory, Inc.
LITTLE FALLS, N. Y.

MAIL COUPON TO-DAY

'JUNKET' BRAND FOODS
Division of Chr. Hansen's Laboratory, Inc., Little Falls, N. Y.

Please send me samples of your infants' and children's diet lists. Also trial packages of 'Junket' Rennet Powder and Tablets

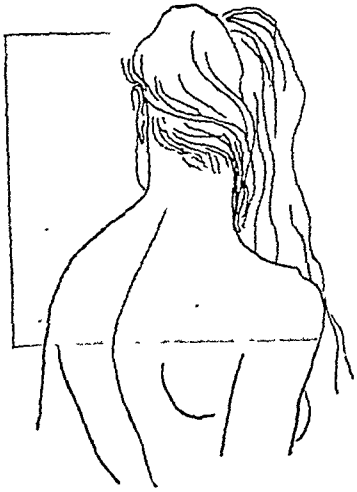
NAME _____
(Please Print)

ADDRESS _____

CITY _____ ZONE _____ STATE _____



when the diagnosis



is seborrheic dermatitis . . . Remember that **Pragmatar**— the outstanding tar-sulfur-salicylic acid ointment— is now recognized as one of the most effective preparations available for the treatment of seborrheic dermatitis, and particularly for the general care and hygiene of the seborrheic scalp.

Pragmatar is also extremely useful in fungous infections, eczematous eruptions, psoriasis and pityriasis rosea.

Pragmatar

Highly effective in an unusually wide range of common skin disorders

Smith, Kline & French Laboratories, Philadelphia

plenty of iron



drop dosage



HUNGRY, HEALTHY, HAPPY Infa-Concemin Kids

it's special for us





it tastes good



all the B complex



Too young to be impressed by the fact that it's good for them, infants and children take Infa-Concemin because it tastes good. They like it! Infa-Concemin is the *one* B complex-iron concentrate designed specifically for small patients. It combines: (1) pleasant taste, (2) the *whole* B complex, (3) an adequate hematinic, and (4) concentrated drop dosage.

····INFA-CONCEMIN····· A MERRELL PEDIATRIC SPECIALTY···

Vitamin B Complex with Ferrous Sulfate

Each 1 cc. contains:

Thiamine hydrochloride	0 8 mg.
Riboflavin	0.8 mg.
Niacinamide	5.0 mg.
Pyridoxine hydrochloride	0.5 mg.
Liver, B complex fraction	67.5 mg.
Rice bran extract	67.5 mg.
Ferrous sulfate	37.5 mg

Indications

Deficiency states associated with anorexia—malnutrition—restricted growth—irritability; as a tonic in post-sulfonamide debilitation and recuperative phases of severe respiratory infections.

Average dose 1 to 3 cc daily (20 to 60 drops from dropper enclosed in package) in milk, fruit juice or directly into the mouth Available in 30 cc dropper bottles and 8 oz bottles



Trademark Infa Concemin" Reg U S Pat Off

MERRELL 1828

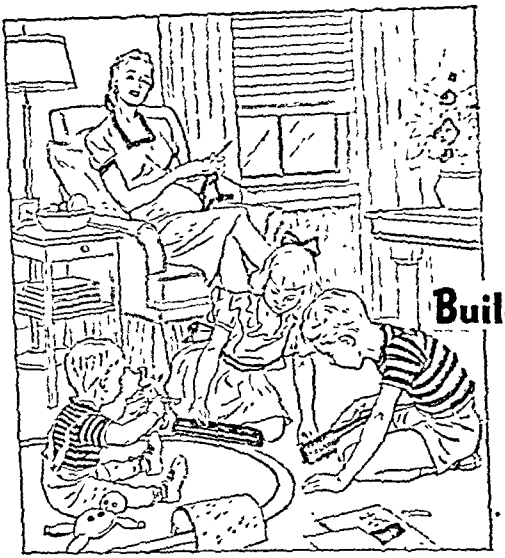
THE WM. S. MERRELL COMPANY · CINCINNATI, U. S. A.

"Just as regularly as orange juice and

also prescribe a substance rich



Pharmaceutical Manufacturers, Newark 7, N. J.



Building Red-Blooded Americans

Ferrous iron in its most agreeable form...

FERGON is Stearns ferrous gluconate...*stabilized* to remain in the ferrous state — generally accepted as the superior form of iron for humans, from the standpoint of *absorption as well* as toleration. [1,2]

Fergon

FERROUS IRON GLUCONATE

For Hypochromic Anemias

THERAPEUTIC APPRAISAL: *Better Tolerated* — Fergon is only slightly ionized, therefore virtually non-astringent, non-irritating... may and should be administered before meals. *Better Absorbed*, Fergon is soluble, and available for absorption, throughout the entire pH range of the gastro-intestinal tract. *Better Utilized*, as shown by comparative clinical studies.[3]

INDICATED in the treatment and prevention of hypochromic anemias; especially valuable in patients intolerant to other forms of iron.

DOSAGE: Average dose for adults is three to six (5 gr.) tablets, for children, one to four (2½ gr.) tablets or one to four teaspoonfuls of elixir daily.

SUPPLIED as 0.325 Gm. (5 gr.) tablets, bottles of 100, 500 and 1000; 0.163 Gm. (2½ gr.) tablets, bottles of 100; 5% elixir, bottles of 6 and 16 fl. oz.

1. Editorial: J. A. M. A. 127:1026, 1945
2. Moore, et al: J. Clin. Investigation 23:547, 1944
3. Reznikoff and Goebel: J. Clin. Investigation 16:547, 1937

Frederick Stearns & Company
Division

DETROIT 31, MICHIGAN New York Kansas City San Francisco Atlanta Windsor, Ontario Sydney, Australia Auckland, New Zealand

Trade-Mark FERGON Reg. U. S. Pat. Off.



Speed Recovery in

CERVICITIS

PENICILLIN VAGINAL SUPPOSITORIES

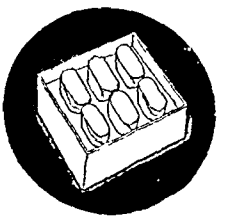
Schenley

Particularly useful in the medical and surgical management of cervicitis due to (or complicated by) penicillin-sensitive organisms.

ADVANTAGES • Potent dosage at site of infection—each suppository provides 100,000 units of penicillin • Painless administration • Simplicity and convenience.

Early favorable response establishes the effectiveness of Penicillin Vaginal Suppositories Schenley.

Suggested Dosage: One suppository on retiring or as required.



Supplied in boxes of 6 and 12

SCHENLEY LABORATORIES, INC.
Executive Offices: 350 Fifth Ave., New York 1, N. Y.

© Schenley Laboratories, Inc.

In the Transition from Childhood to Adolescence



In the transitional stage from childhood to adolescence, when the dual requirements of growth and vigorous physical exercise call for seemingly excessive quantities of food, special attention must be paid to nutritional requirements. In outlining a sound nutrition program, the importance of breakfast cannot be overlooked.

A good breakfast provides from one-fourth to one-third of the daily caloric and nutrient requirements. A basic breakfast pattern, widely recommended by nutrition authorities, provides fruit, cereal (hot or ready to eat), milk, bread and butter and is easily augmented by other foods when desired.

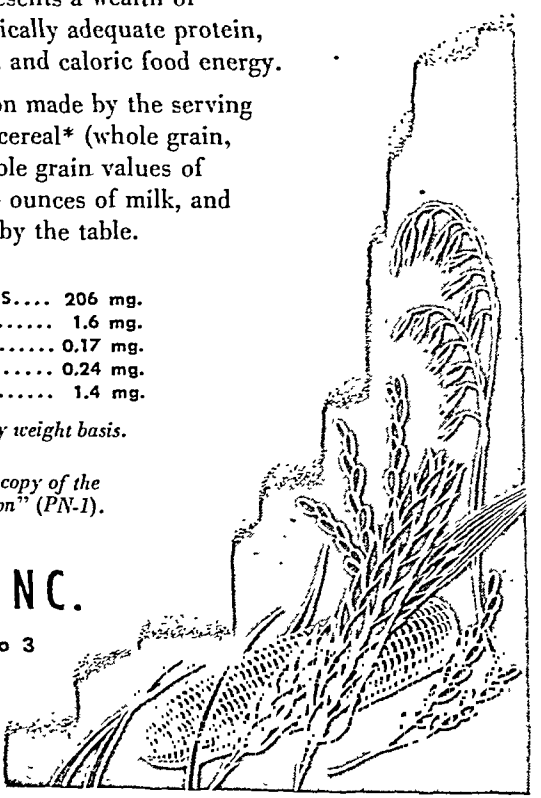
Breakfast cereals constitute an integral component of the basic breakfast. The cereal serving, consisting of cereal, milk, and sugar, presents a wealth of essential nutrients: biologically adequate protein, B vitamins, important minerals, and caloric food energy.

The quantitative contribution made by the serving of 1 ounce of ready-to-eat or hot cereal* (whole grain, enriched, or restored to whole grain values of thiamine, niacin and iron), 4 ounces of milk, and 1 teaspoonful of sugar, is indicated by the table.

CALORIES.....	202	PHOSPHORUS....	206 mg.
PROTEIN.....	7.1 Gm.	IRON.....	1.6 mg.
FAT.....	5.0 Gm.	THIAMINE.....	0.17 mg.
CARBOHYDRATE .	33.0 Gm.	RIBOFLAVIN.....	0.24 mg.
CALCIUM.....	156 mg.	NIACIN.....	1.4 mg.

**Composite average of all breakfast cereals on dry weight basis.*

Physicians are invited to send for a complimentary copy of the brochure "Cereals and Their Nutritional Contribution" (PN-1).



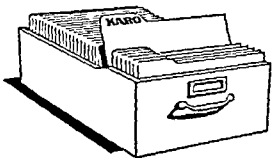
CEREAL INSTITUTE, INC.

135 South La Salle Street • Chicago 3

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.



Young Stanley Rittgers, weighing 14 pounds at 3 months, is being raised on KARO Syrup. So was his admiring sister, Winifred, and so was their mother, Mrs. Fred Rittgers.*



Heritage of the Second Generation

KARO formulas for infant feeding continue to be prescribed for the second generation in millions of families. Physicians for nearly 30 years have depended on KARO formulas because of KARO's easy digestibility.

Dependable, too, are KARO's other advantages. KARO is non-allergenic, little fermentable and bacteriologically safe. It is readily miscible and easily available. Both *Red Label* KARO and *Blue Label* KARO are interchangeable in all formulas.

Have you seen the new Infant Feeding book for physicians? If you have not received a copy of the new 1947 edition of "Infant Feeding in Every Day Practice," please send us your name and address. Prescription pads, free from advertising, will also be sent on request.

Medical Division
CORN PRODUCTS SALES COMPANY
17 BATTERY PLACE, NEW YORK 4, N.Y.



*KARO is a registered trade-mark of Corn Products Refining Company, New York, N. Y.



Wouldn't YOU smile too if . . .

. . . all babies took to their first cereal the way this young enthusiast takes to his Gerber's?

Of course, more babies would balk less if their mothers took your advice about starting slowly—with small quantities of cereal diluted to almost liquid consistency.

And more mothers and doctors would have less trouble with baby's first solid food after milk, if baby liked the *texture* and *taste* of his cereal. So, with that in mind, may we point out that

90% OF THE BABIES WHO START ON GERBER'S CEREALS STAY WITH THEM (according to a recent survey). *Finely strained* Gerber's Cereal Food, Strained Oatmeal and Barley Cereal are so good-tasting. They give baby appetite-tempting variety—plus *added iron, calcium,* and *B-complex vitamins.* And, Gerber's are so low priced—from Cereals through Strained and Junior Foods.

FREE SAMPLES of Gerber's ready-to-serve Cereals—plus professional reference cards. Write to Gerber's, Dept. 279-7, Fremont, Mich.

Babies are our business... our only business!

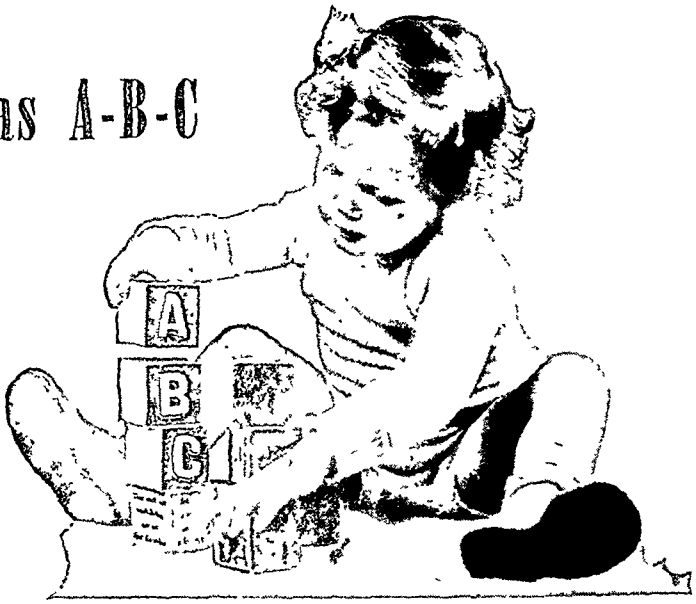
Gerber's

BABY FOODS

FREMONT, MICH. OAKLAND CAL.

3 CEREALS • 18 STRAINED FOODS • 13 JUNIOR FOODS

As simple as A-B-C

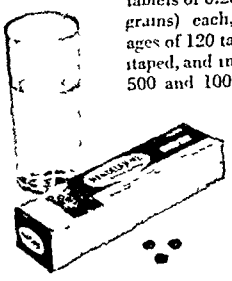


MANDELAMINE

Reg U. S Pat Off

(Methenamine Mandelate)

Mandelamine is supplied in enteric coated tablets of 0.25 Gm. (3¾ grains) each, in packages of 120 tablets, sanitaped, and in bottles of 500 and 1000.



An increasing number of physicians are discovering that the treatment of common urinary infections with Mandelamine is as simple as A-B-C. Three to four Mandelamine tablets, administered *orally* three times daily, will promptly control urinary infection in a high percentage of patients. Disturbing urinary symptoms are usually alleviated rapidly and, in the absence of obstruction, the urine is promptly cleared of pathogenic organisms.

The uncomplicated oral administration of Mandelamine requires *no* supplementary acidification (except in those cases where urea splitting organisms are present), restriction of fluid intake, dietary control, or other special measures, and Mandelamine may be administered virtually without consideration of toxic effects—thus eliminating the necessity for careful selection of patients. A physician's sample and literature on request.

NEPERA CHEMICAL COMPANY, INC.

Manufacturing Chemists

Yonkers 2
New York



Baby's First Shoes

"All God's chilluns got shoes"—but not always such fine ones as these. For this wee-winkie gets the best of everything, from expertly designed shoes to meals rich with White House Milk. This famous milk supplies each essential nutrient of fresh milk plus generous amounts of pure vitamin D_3. Its wholesomeness and convenience make milk mother's first thought for infant feeding, and her doctor agrees. There's none better.

WHITE HOUSE MILK

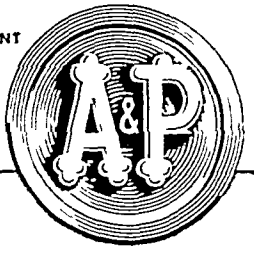
There's None Better

400 U.S.P. UNITS OF PURE VITAMIN D_3 PER PINT

SOLD AND GUARANTEED* BY A&P

Mother's first thought for infant feeding!





*Satisfaction Guaranteed or money back

Not Connected With Any Company Using A Similar Name Or Brand

TIME AGAIN FOR THE 4 R's



Schooltime soon, for your young patients. The time when they need every bit of energy they can muster.

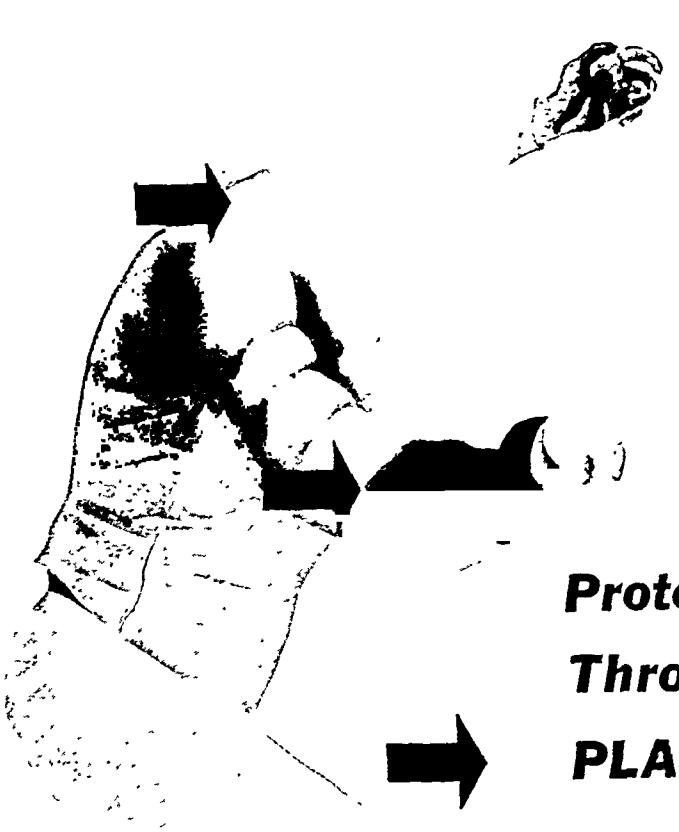
Hot Ralston Whole Wheat Cereal, at breakfast, helps to give them the right start. This is the whole wheat cereal with extra wheat germ—2½ times as much as natural whole wheat itself! As you know, wheat germ is the richest cereal source of thiamine, (vitamin B_1) — the vitamin needed to convert carbohydrates into energy. You know, too, that every child needs the whole-grain nourishment hot Ralston supplies.



Good reasons why you should recommend hot Ralston as the fourth "R," when school days roll around again!

⇦ TWO KINDS OF HOT RALSTON

RALSTON PURINA COMPANY
Checkerboard Square, St. Louis 2, Mo.



Protection Through PLANNING

There is widespread agreement that fluorine is an important factor in preventing tooth decay. In "Enziflur" Lozenges, this substance is presented as calcium fluoride in combination with vitamins C and D . . . for the planned protection of the teeth against caries attacks.

"Enziflur" Lozenges should be allowed to dissolve slowly in the mouth in order to bring the fluorine-bearing saliva in prolonged contact with the surfaces of the teeth.

Descriptive literature outlining indications, dosages and contraindications available to physicians and dentists upon request.

"Enziflur" Lozenges (No. 805) are available in bottles of 30 and 100 each.

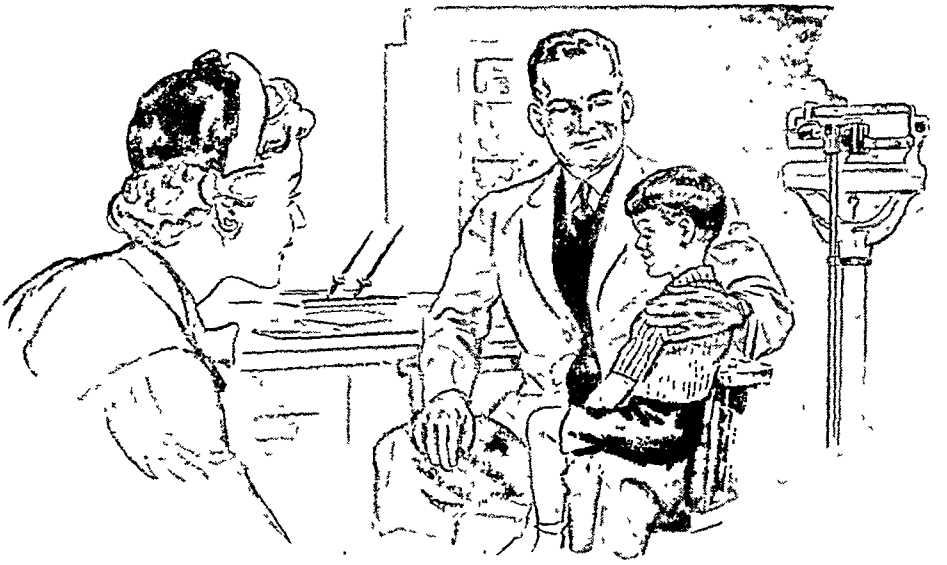
Ayerst

"ENZIFLUR"® *Lozenges*

AS AN AID IN THE PREVENTION OF DENTAL CARIES

AYERST, McKENNA & HARRISON Limited

22 EAST 40TH STREET, NEW YORK 16, N. Y.



WHEN CORRECTIVE MEASURES ARE REQUIRED IN UNDER-NUTRITION

The food drink made by mixing Ovaltine with milk finds frequent application whenever underpar nutrition in children is encountered. It is equally valuable in pediatric practice whether the need for dietary supplementation arises from food resistance, from the ravages of acute infectious disease, from dietary limitations made necessary by surgery, or from the augmented nutritional demands occasioned by periods of rapid growth.

This dietary supplement is readily digested and thoroughly bland. Its delicious taste is appealing to all youngsters, who drink it with relish even when milk itself is refused. Taken hot or cold, it is equally acceptable in either form. It supplies a wealth of all nutrients considered essential, including B complex vitamins and ascorbic acid. Its proteins are biologically complete, a feature of importance in the correction of debility states. Three glassfuls daily of this delicious food drink round out even an average diet to full nutritional adequacy.

May be employed with equal advantage as a mealtime beverage or with between-meal snacks.

THE WANDER COMPANY, 360 N. MICHIGAN AVE., CHICAGO 1, ILL.



Ovaltine

Three servings daily of Ovaltine, each made of ½ oz. of Ovaltine and 8 oz. of whole milk,* provide:

CALORIES	669	VITAMIN A	3000 I U
PROTEIN	32 1 Gm	VITAMIN B_1	1 16 mg
FAT	31 5 Gm	RIBOFLAVIN	2 00 mg
CARBOHYDRATE	64 8 Gm.	NIACIN	6 8 mg
CALCIUM	1 12 Gm	VITAMIN C	30 0 mg
PHOSPHORUS	0 94 Gm	VITAMIN D	417 I U
IRON	12 0 mg	COPPER	0 50 mg

*Based on average reported values for milk

cod liver oil are prescribed, one should in vitamin B for the infant dietary..."

As long as 20 years ago Hoobler[1] (quoted above) advocated routine supplementation of the infant dietary with a good source of vitamin B factors. He, as well as other investigators, recognized that symptoms of partial vitamin B deficiency observed in infants are often traceable to the fact that both human and cow's milk are relatively lacking in certain B factors.

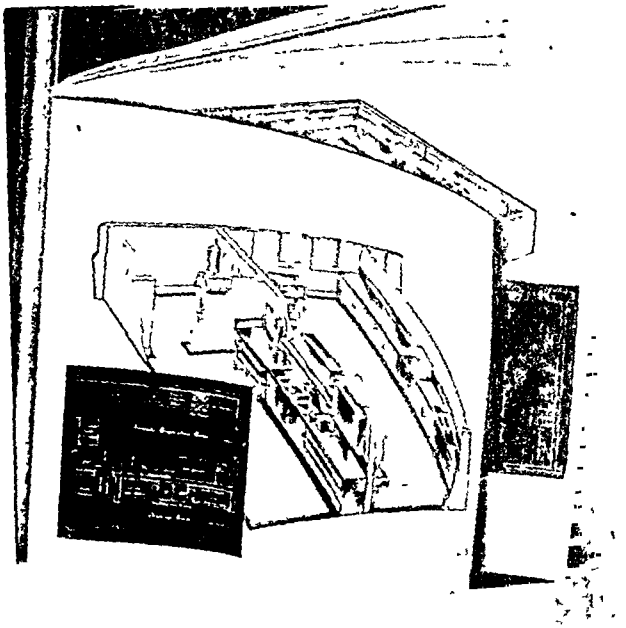
Five drops daily of White's Multi-Beta Liquid provides a generous supply of all clinically important B vitamins *in proportion to their inadequacy* in the average infant diet and offers, in addition, a simple means of managing the commonly encountered gastro-intestinal disturbances of infancy.

Pleasant tasting, it is easy to take in milk mixtures, orange juice, soft feedings or directly from the dropper.

1. Hoobler, B.R.: Symptomatology of Vitamin B Deficiency in Infants, J.A.M.A., *91*:307-310 (Aug. 4) 1928.

M *Liquid*

correct deficiencies in infant diets



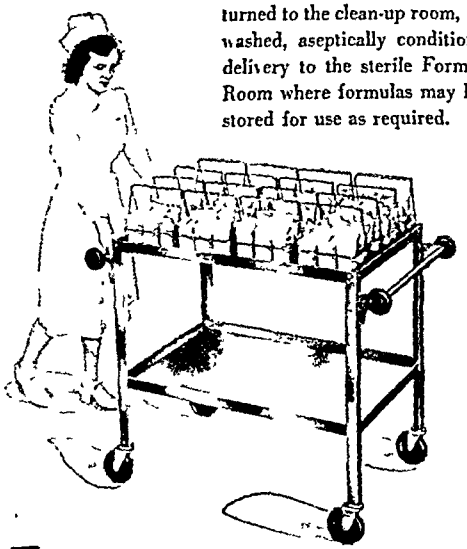
A Challenge is met...

Mass spread of diarrheal diseases of the newborn, potentially traceable to inefficient and outmoded procedures and facilities designed to insure the sterility of foods and supplies, can be effectively reduced ... often eliminated, with the new "*American*" *developed*

Milk Formula Laboratory Service

PRESENTS A COMPLETE PROGRESSIVE ROUTINE

Provides unprecedented efficiency, speed and safety. Used containers and supplies, when returned to the clean-up room, are conveniently washed, aseptically conditioned for prompt delivery to the sterile Formula Preparation Room where formulas may be prepared and stored for use as required.



MEETS ALL CAPACITY NEEDS

Units of equipment which include special bottle washing units, sterilizer-disinfectors, precision water sterilizers, work counters, storage cabinets, bottle warmers, portable carriages and allied units are designed to accommodate capacity requirements of from 72 bottles per day up to unlimited needs.

CONSULT OUR PLANNING SERVICE...

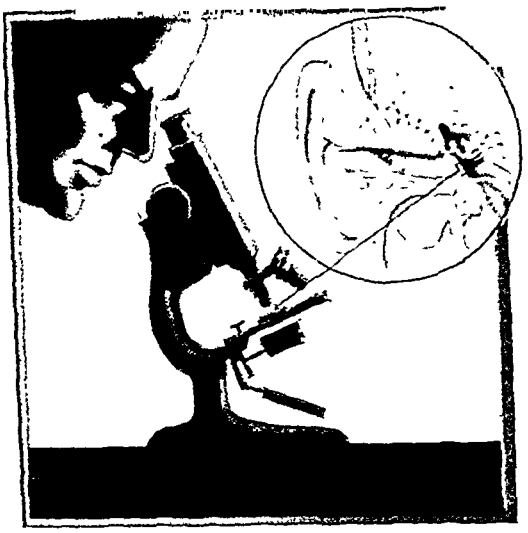
staffed by able technicians thoroughly qualified to assist you in planning an installation best suited to your available facilities... a gratis service.

WRITE TODAY for complete details

AMERICAN STERILIZER COMPANY
Erie, Pennsylvania

DESIGNERS AND MANUFACTURERS OF SURGICAL STERILIZERS, TABLES AND LIGHTS

PIONEERS in Research . . . and Leadership thru the years in combating



DOHO in realizing the need for a potent, topical, well tolerated ear medication, yet mindful that no one formula could be suitable for all conditions . . . devoted every facility and scientific resource to the development and perfection of AURALGAN and OTOSMO-SAN. Each has its sphere of usefulness . . . each has been tested and clinically proven in many thousands of cases. *Reprints and substantiating data sent on request.*

EACH A SPECIFIC . . . both effective!

Auralgan
IN ACUTE OTITIS MEDIA

is a scientifically prepared, completely water-free Glycerol (DOHO) having the highest specific gravity obtainable, containing antipyrine and benzocaine . . . which by its potent decongestant, dehydrating and analgesic action provides effective relief of pain and inflammation.

O-TOS-MO-SAN
IN CHRONIC SUPPURATIVE OTITIS MEDIA, FURUNCULOSIS AND AURAL DERMATITIS

is not just a mere mixture, but a scientifically potent chemical combination of Sulfathiazole and Urea in AURALGAN Glycerol (DOHO) base . . . which exerts a powerful solvent action on protein matter, liquefies and dissolves exuberant granulation tissue, cleanses and deodorizes, and tends to exhilarate normal tissue healing in the effective control of chronic suppurative otitis media.

Literature and samples on request

THE DOHO CHEMICAL CORPORATION
New York 13, N. Y. • Montreal • London



The Book of Life ...on one page

"Each person in the world creates a Book of Life. This book starts with birth and ends with death... has many pages for some and is but a few pages in length for others."[1]

A single page tells the life story of those infants who die within the first 30 days after birth. It is during this fatal first month that 62.1% of all infant mortality occurs—an increase of almost 10% in the past 20 years. There is urgent need then to utilize every advantage science offers in eliminating the hazards of neonatal life. A good start on the right feeding can do much to minimize the gastrointestinal hazards of excessive fermentation, upset digestion and diarrhea.

'Dexin' has proved an excellent "first carbohydrate" because of its high dextrin content. It (1) resists fermentation by the usual intestinal organisms; (2) tends to hold gas formation, distention and diarrhea to a minimum, and (3) promotes the formation of soft, flocculent, easily digested curds. 'Dexin' *does* make a difference.

1. Dunn, H. L. Am. J. Pub. Health 36:1412 (Dec.) 1946.

'Dexin' HIGH DEXTRIN CARBOHYDRATE
BRAND

Composition—Dextrins 75% • Maltose 24% • Mineral Ash 0.25% • Moisture 0.75% • Available Carbohydrate 99% • 115 calories per ounce • 6 level packed tablespoonfuls equal 1 ounce • Containers of twelve ounces and three pounds • Accepted by the Council on Foods and Nutrition, American Medical Association.
'Dexin' Reg. Trademark

Literature on request

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 East 41st St., New York 17, N. Y.

why CEREVIM *is high in Niacin*



"Nicotinic acid is found in natural foods only in limited amounts."

—J. S. McLester.[1]

It is not generally realized that many of the commonest articles of the "good" diet—namely: milk, eggs, fruits, and vegetables—are "low and poor sources of niacin".[1] This deficiency takes on significance in the feeding of the pre-school child who often refuses a well-rounded diet.

Even the child with anorexia, however, will usually take a serving of cereal a day. And when that cereal is **CEREVIM** it not only tempts the child's appetite, but at the same time provides the entire recommended daily allowance* of niacin, as well as thiamine, riboflavin, and iron.[2]

Niacin is needed in amounts approximately 8 to 10 times that of thiamine, and **CEREVIM** has this desirable niacin-thiamine ratio—6.0 and 0.6 mg., respectively, per ounce.[2]

(1) J. S. McLester: Nutrition and Diet in Health and Disease, 1943.
(2) Recommended Dietary Allowances, National Research Council, 1945.

*For children up to 3 years of age.

Trade-Mark CEREVIM Reg. U.S. Pat. Off.

Lederle

LEDERLE LABORATORIES DIVISION
AMERICAN CYANAMID COMPANY • NEW YORK 20, NEW YORK

CONDITIONS

Constipation—Loose irritating stools—Periods of alternating constipation and loose stools.

ADVANTAGES

Zymenol's Twofold Natural Therapy: Brewers yeast enzymatic action helps re-establish physiological bowel content. Natural vitamin B complex tends to normalize bowel tone.

Non Habit-Forming: No irritant or habit-forming drugs. No bulking agents. Even sugar free.

Teaspoon Dosage Only: Minute quantity of mineral oil per dose is not likely to interfere with vitamin absorption or digestion. Avoids leakage.

Available in 1¼ and 8 oz. prescription units at drug stores everywhere.



Zymenol

For Effective Bowel Management

An Emulsion with Brewers Yeast

MAIL THIS COUPON

Otis E. Glidden & Co., Inc., 518 Davis Street, Evanston, Ill.
Please send literature and trial supply of ZYMENOL

Dr.....

Address.....

City.....Zone....State.....

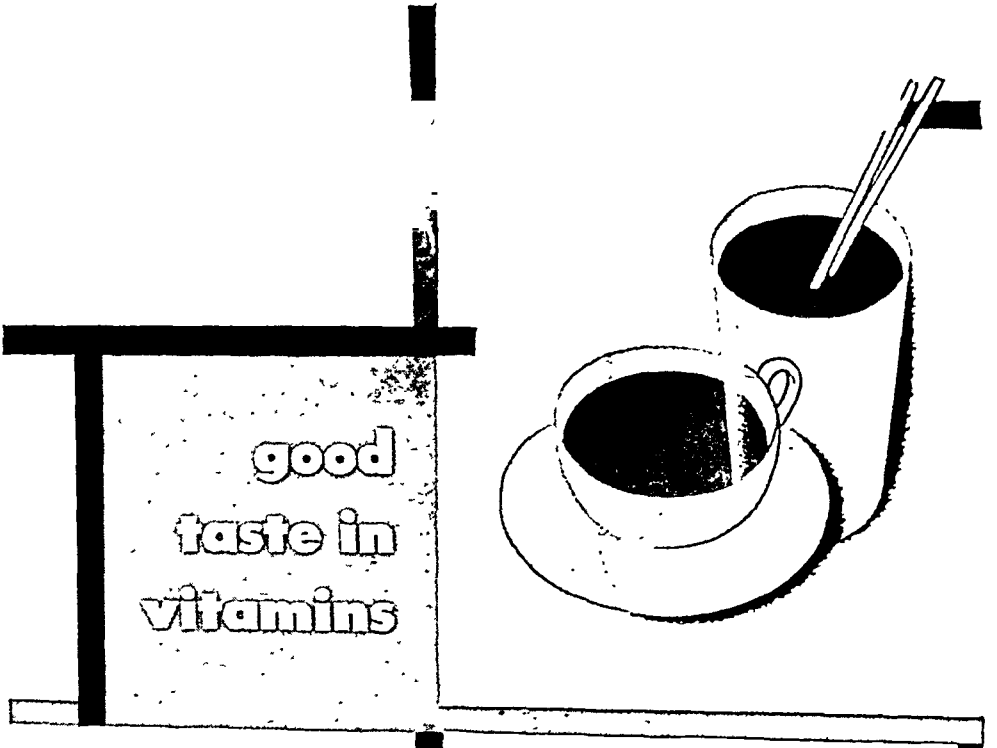
OTIS E. GLIDDEN & CO., INC., EVANSTON, ILL.

Baby Breck

OINTMENT
For Aiding Diaper Rash

Baby Breck Ointment was designed to help eliminate and prevent diaper rash. It gives a waterproof coating to the skin, which is longer lasting than any other ever developed. Baby Breck may be applied once or twice a day, or in the evening to protect the skin through the night period.

JOHN H BRECK INC · MANUFACTURING CHEMISTS SPRINGFIELD 3 MASSACHUSETTS
CANADIAN ADDRESS · 310 SLATER STREET · OTTAWA



Each serving (2 heaping teaspoonfuls) contains approximately:

Vitamin A . . . . . 2000 U.S.P. units
Vitamin B_1 (Thiamine hydrochloride) 2 mg
Vitamin B_2 (Riboflavin) . . . . . 1 mg
Vitamin C (Ascorbic acid) . . . 75 mg
Vitamin D (Activated ergosterol) 500 U.S.P. units
Niacinamide . . . . . 5 mg

Cal-C-Tose is never advertised to the laity.

Cal-C-Tose,* mixed with hot or cold milk, makes a refreshing, nutritious beverage which tempts even jaded appetites. This tasty chocolate drink supplies liberal amounts of vitamins A, B_1, B_2, C, D, and niacinamide, as well as calcium, phosphorus, iron, and other nutrients. Patients actually enjoy vitamins in the form of Cal-C-Tose.

Hoffmann-La Roche, Inc. • Nutley 10, N. J.

CAL-C-TOSE 'ROCHE'

*Reg U. S. Pat. Off

BRISTOL Penicillin in Oil and Wax is now

LIQUID

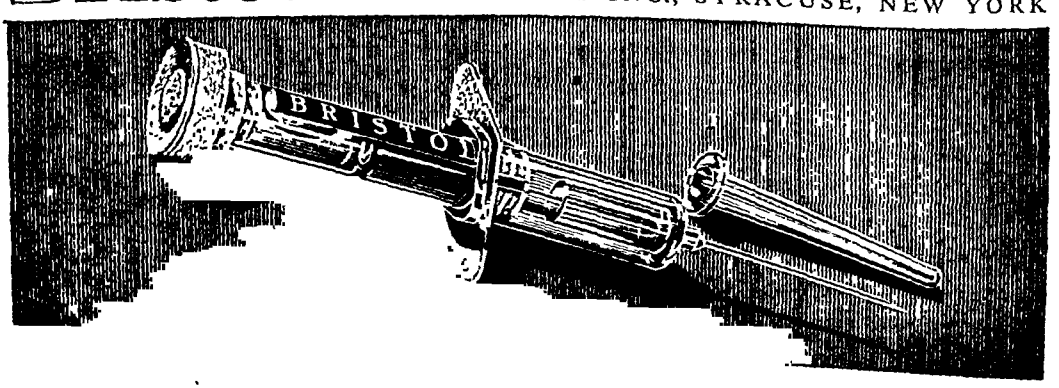
. . . for easier administration

Now you can inject Bristol's Crystalline Sodium Penicillin G in Oil and Wax (Romansky Formula) with far greater ease than in the past. Due entirely to changes in the manufacturing process and without any alteration in formula, the viscosity of the product at room temperature has been brought to a point which approximates that of U.S.P. glycerin. Clinical studies meanwhile indicate no change in the ability of the product to maintain adequate levels of penicillin in the blood for about 24 hours.

This is a significant development in penicillin therapy. Specify Bristol and obtain the benefits of LIQUID Romansky Formula.

Supplied in one cc. cartridges of 300,000 units, with or without special syringe equipment, and in 10 cc. rubber-stoppered vials. Needs no refrigeration in storage or warming before use.

Bristol LABORATORIES INC., SYRACUSE, NEW YORK



A Ciba Announcement to Doctors

EFFECTIVE IMMEDIATELY

25% to 50% Reductions

NEW LIST PRICES TO PHYSICIANS

PERANDREN

Testosterone Propionate, U.S.P. XIII

In solution, ready for intramuscular injection

Ampuls 1 cc., 5 mg.

cartons of 3 ..... each $ 1.44
cartons of 6 ..... each 2.52
cartons of 50 ..... each 18.00

Ampuls 1 cc., 10 mg.

cartons of 3 ..... each 2.28
cartons of 6 ..... each 4.08
cartons of 50 ..... each 28.80

Ampuls 1 cc., 25 mg.

cartons of 3 ..... each 3.90
cartons of 6 ..... each 7.02
cartons of 50 ..... each 50.40

Multiple-Dose Vials, 10 cc. 10 mg. per cc.

carton of 1 ..... each 4.98

Multiple-Dose Vials, 10 cc. 25 mg. per cc.

carton of 1 ..... each 8.58

(N) *Multiple-Dose Vials, 10 cc. 50 mg. per cc.*

carton of 1 ..... each 17.16

METANDREN

Methyltestosterone, U.S.P. XIII

For oral administration

Linguets® 5 mg.

boxes of 30 ..... each $ 1.92
bottles of 100 ..... each 5.28

(N) *Linguets® 10 mg.*

bottles of 30 ..... each 3.54
bottles of 100 ..... each 9.78

Tablets 10 mg.

bottles of 30 ..... each 3.54
bottles of 100 ..... each 9.78

(N) *Tablets 25 mg.*

bottles of 15 ..... each 5.28
bottles of 100 ..... each 24.48

(N) *NEW HIGH-POTENCY DOSAGE FORMS*

ON ALL CIBA ANDROGENS

New economy has been added to the true economy of Ciba Androgens

NEW ECONOMY Ciba is proud to pioneer again by bringing you the most gratifying news about male hormones since the introduction of Ciba's PERANDREN®. Now the benefits of male-hormone therapy are extended to patients with modest incomes.

Doctors will share our satisfaction in this achievement. The growth in clinical uses for the androgens has so increased demand that Ciba's large-scale production now makes possible the greatest savings ever offered in this field.

TRUE ECONOMY The true economy of Ciba Androgens is not news: METANDREN® LINGUETS® (the exclusive Ciba dosage form) are known to offer the most economical way to provide continuous male-hormone effects by convenient *oral* administration. Absorbed directly from the oral mucosa, LINGUETS are effective with ½ to ½ less dosage than tablets.

For *injection*, the high-potency PERANDREN multiple-dose vial (50 mg. per cc.) is the most economical preparation for office use: makes each dose cost substantially less than with ampuls.

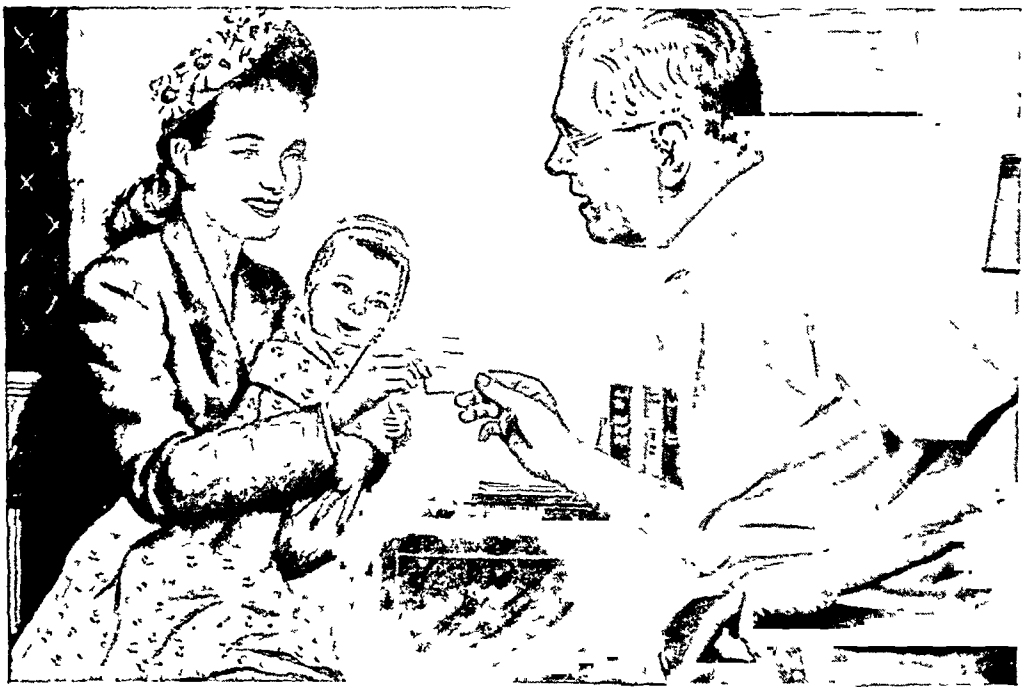
®T. M. Reg. U. S. Pat. Off.

CIBA PHARMACEUTICAL PRODUCTS, Inc., SUMMIT, NEW JERSEY

Your Job— And Ours:

To Give Him a Good Start

We've worked with the profession for more than three generations to develop milk-food for babies. Nestlé's Evaporated Milk has the nutritive value of whole cow's milk—*plus something extra.* Every pint supplies 400 U.S.P. units of pure Vitamin D_3... the full daily minimum required by infants.



Nestlé's Has the "Know-How" to Produce a Good Product

- For 75 years, Nestlé's milk products have been best known, most used for babies 'round the world.
- Nestlé's was the *first* evaporated milk fortified with 400 U.S.P. units of genuine Vitamin D_3 per pint.
- Nestlé's accepts milk only from carefully inspected herds. As further assurance of quality, rigid controls check Nestlé's Milk every step of the way. We even take the plant apart every day and wash it!

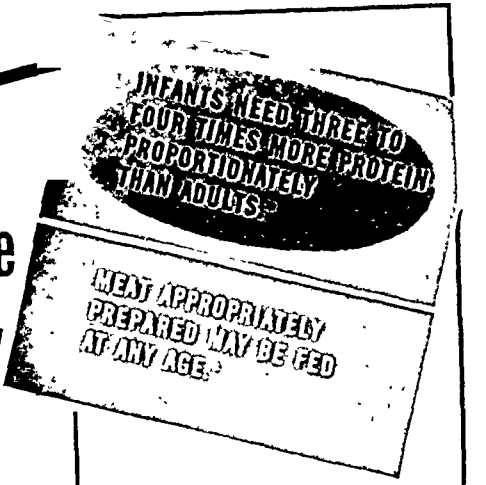
NESTLÉ'S
EVAPORATED
MILK



No wonder so many doctors recommend NESTLÉ'S Milk by name

NESTLÉ'S MILK PRODUCTS, INC., New York, U.S.A.

Infants need three to four times more proteins proportionately than adults*





Swift's Meats for Babies provide complete, high-quality proteins to help meet infants' needs.

To support their rapid growth, infants actually need 3 to 4 times more protein, proportionately, than adults. Meat is one of our finest sources of complete, high-quality proteins. In the past, meat was usually withheld from infants because of the difficulty of preparing it properly. But now infants of any age may benefit from the nutrients of meat. Swift & Company prepares it in two special forms—*strained* for young babies, *diced* for older babies. Today, when you recommend meat in a baby's diet, his mother can follow your feeding instructions *exactly—easily*, because Swift's Meats for Babies are ready to heat and serve!

Six tempting kinds of meat: beef, lamb, pork, veal, liver and heart provide variety in baby's diet. They offer new flavor and texture experiences that help him acquire new tastes . . . form nutritionally sound eating habits. In addition to complete, high-quality proteins, Swift's Meats for Babies furnish goodly amounts of thiamine, niacin and riboflavin, plus minerals, notably iron.

ACCEPTED COUNCIL ON FOODS AND NUTRITION AMERICAN MED. ASSOC.

All nutritional statements made in this advertisement are accepted by the Council on Foods and Nutrition of the American Medical Association.

*Name of authorities on request

SWIFT QUALITY FOODS

Swift's Strained Meats and Swift's Diced Meats...

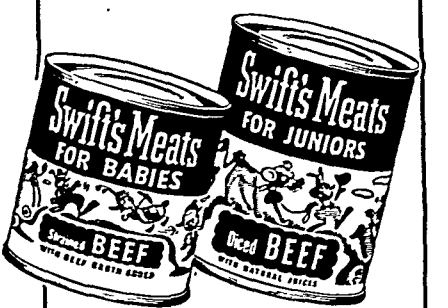
meet the exacting requirements of a highly desirable infant food

1. *Nutrition for growth*—Swift's Meats for Babies furnish complete, high-quality proteins, B vitamins and iron.

2. *Compact form*—for infants' limited capacity—*all meat*, not mixtures, they provide a concentrated source of vital nutrients.

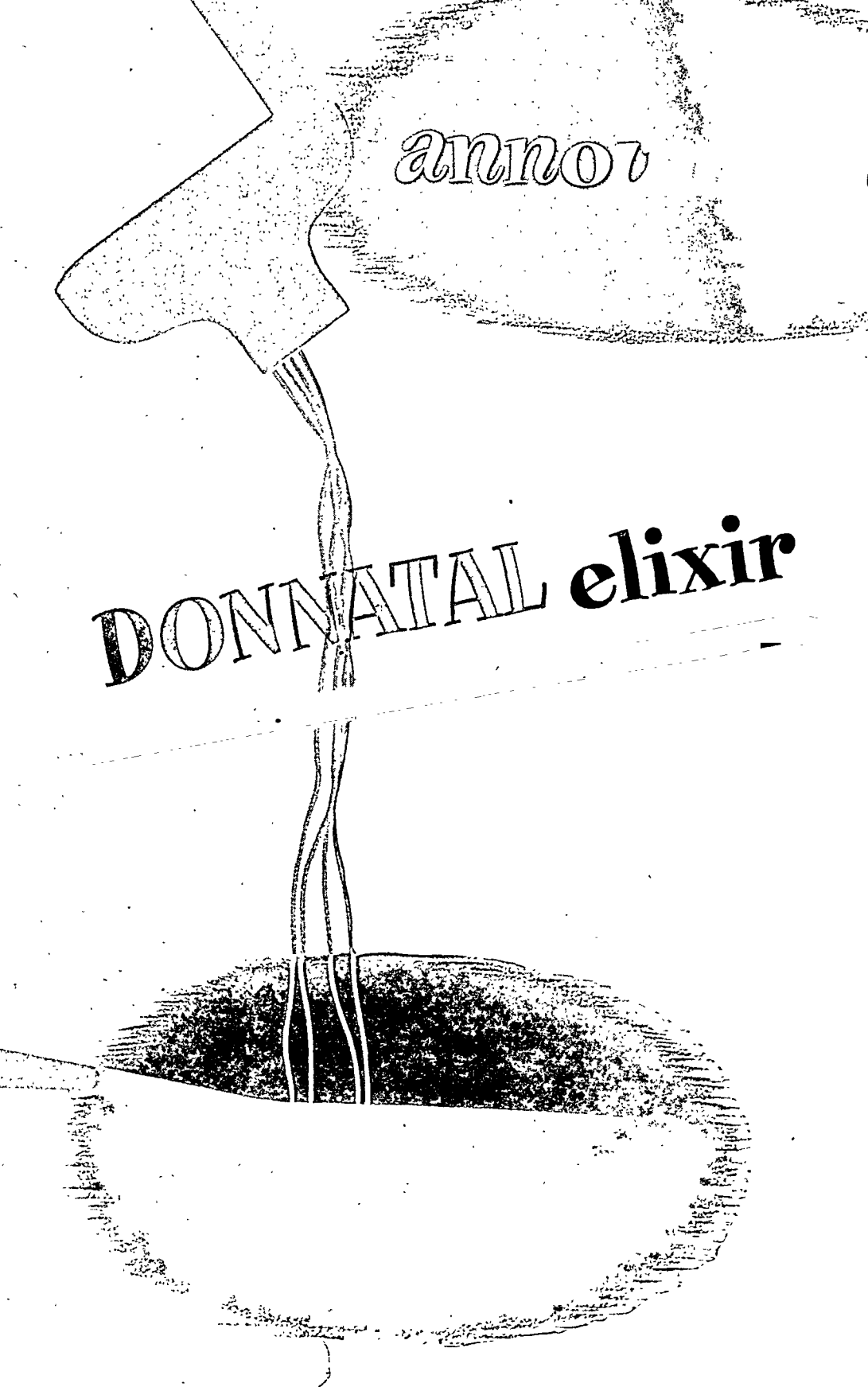
3. *Control—for individual needs.* Ready-made mixtures may fail to meet individual needs. Mothers can control and balance amounts of meat *exactly* with Swift's Strained and Swift's Diced Meats.

4. *Variety for nutritionally sound eating habits*—six different all-meat products to help infants acquire the taste for variety, the foundation of good nutrition.



Write for complete information and samples of Swift's Meats for Babies and Juniors, address Swift & Company, Dept. B.F., Chicago 9, Ill.

SWIFT & COMPANY • CHICAGO 9, ILL.


annoy
DONNATAL elixir



No...it won't taste gritty to his tongue...

Mothers appreciate the smoothness of texture and uniform consistency of Libby's Baby Foods. Infants are quick to detect large particles and to spit them out . . . with Libby's this never occurs. Through Libby's exclusive process of homogenization, cellulose capsules are ruptured, and cell envelopes are reduced to microscopic dimensions. Nutrients are homogeneously dispersed throughout the food mass, making for greater and easier availability. Grittiness is impossible with this process. In consequence. Libby's have been fed as early as the 6th week of life. since they flow freely through normal nipple openings when mixed with the milk formula.

ACCEPTED

Beets • Carrots • Green Beans • Peas • Spinach • Squash • Vegetable Soup • Mixed Vegetables • Garden Vegetables • Liver Soup • Vegetables with Bacon • Vegetables with Beef and Barley • Vegetables with Lamb • Apples and Apricots • Apples and Prunes • Apple Sauce • Peaches • Peaches-Pears-Apricots • Pears and Pineapple • Prunes (with Pineapple Juice and Lemon Juice) • Custard Pudding

Libby, McNeill & Libby • Chicago 9, Illinois





WELL TOLERATED by the NEWBORN

Clinical experience establishes that CARTOSE* is especially well tolerated by newborn infants.

CARTOSE supplies carefully balanced amounts of non-fermentable dextrins, with maltose and dextrose. These offer the advantages of: spaced absorption because of the time required for hydrolysis of the higher sugars; less likelihood of distress due to the presence of excessive amounts of fermentable sugars in the intestinal tract at one time.

CARTOSE is liquid; formula preparation is simple, rapid, and accurate. It is compatible with any formula base: fluid, evaporated, or dried milk.

*The word CARTOSE is a registered trademark of H. W. Kinney and Sons, Inc.

CARTOSE
REG. U. S. PAT. OFF.
Mixed Carbohydrates

H. W. KINNEY & SONS, INC. — Kinney trademark — COLUMBUS, INDIANA



Formulac

is vitamin-fortified

A product of National Dairy research, FORMULAC Infant Food is fortified with all the vitamins known to be necessary for adequate infant nutrition. Incorporating the vitamins *into the milk itself* reduces the risk of human error or oversight in supplementary administration.

FORMULAC is a concentrated milk in liquid form. It contains sufficient vitamins of the B complex, Vitamin C in stabilized form, Vitamin D (800 U.S.P. units), copper, manganese and easily assimilated ferric lactate—rendering it an adequate formula basis both for normal and difficult feeding cases. *No carbohydrate has been added to* FORMULAC. It contains only the natural lactose found in cow's milk.

FORMULAC is promoted ethically, to the medical profession alone. It has been tested clinically, and proved satisfactory in promoting normal development and growth. Manufactured under the Sealtest system of quality control, FORMULAC is available in drug and grocery stores from coast to coast.

• For further information about FORMULAC, and for professional samples, drop a card to National Dairy Products Company, Inc., 230 Park Avenue, New York 17, N. Y.



DISTRIBUTED BY KRAFT FOODS COMPANY

NATIONAL DAIRY PRODUCTS COMPANY, INC.
NEW YORK, N.Y.

The immunization schedule for the two series is detailed in Table I. In the "A" series, immunization of fifty-seven children was started with an injection of 0.1 c.c. of plain DPT vaccine, followed one week later by the injection of 0.5 c.c. that initiated the regular series. This precaution was taken at the beginning of the investigation to avoid severe reactions to the vaccine. Only thirty-seven of the fifty-seven patients were tested for serum antibody titer. Because of the small dose given, the short interval between the first two injections, and the lack of increased antibody response, as compared with the other cases receiving an initial dose of 0.5 c.c., it is felt that this additional 0.1 c.c. of vaccine can be disregarded safely in evaluating the results.

TABLE I. SCHEDULE OF IMMUNIZATIONS

INJECTIONS	PLAIN DPT VACCINE (40 BILLION H. PERTUSSIS PER C.C.) (C.C.)	ALHYDROX (20 BILLION H. PERTUSSIS PER C.C.) (C.C.)
1st injection	0.5	0.5
2nd injection (1 month after first)	1.0	1.0
3rd injection (1 month after second)	1.0	1.0
Total dose *H. pertussis*	100 billion	50 billion

Blood samples for agglutinin and antitoxin determinations were obtained as follows: (a) before immunization; (b) about one month (one to two months) after completion of the immunization series: and (c) about six months (six to nine months) after completion of the immunization series. Schick tests were done in twenty-four children of series A and in thirteen of series B after the second postimmunization blood sample had been obtained.

LABORATORY METHODS

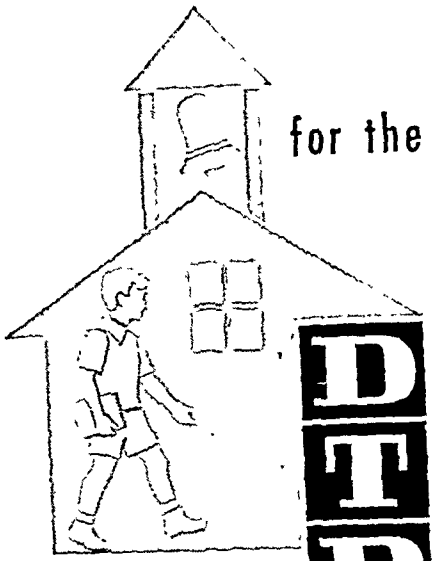
The diphtheria antitoxin titrations were carried out in guinea pigs according to a modification of the Kellog test.

The titrations of tetanus antitoxin were done according to the method recommended by the National Institute of Health.

The serum agglutinins against *H. pertussis* were determined by the Cutter modification of the method of Miller[6] and by the method of Flosdorf.[7] A fresh antigen was also used in performing the agglutinative tests after this date.

All laboratory determinations were done by the Biological Control Division of Cutter Laboratories, Berkeley, Calif. The blood samples obtained were labeled according to a code system* known to the group carrying out the clinical part of the investigation, but unknown to the people doing the laboratory determinations. The samples were numbered progressively as obtained and in the same code were included not only children of the two series here reported, but also those of three other groups to be reported at a later date. This precaution provided a further check of the antibody and antitoxin titrations.*

*Not included in this code system were most of the preimmunization blood samples of both series and forty of the specimens obtained one month after immunization in Series A.



for the approaching school days

Diphtheria
Tetanus
Pertussis

IMMUNITY FROM ALL THREE IN ONE SOLUTION

When you are planning for the inoculations to be given as school days roll around again, remember the convenience and efficacy of National Drug's Diphtheria-Tetanus-Pertussis Combined. Immunity against these three diseases is conferred with three injections at intervals of from 3 to 4 weeks. Diphtheria-Tetanus-Pertussis Combined is available in multiple-dose vials.

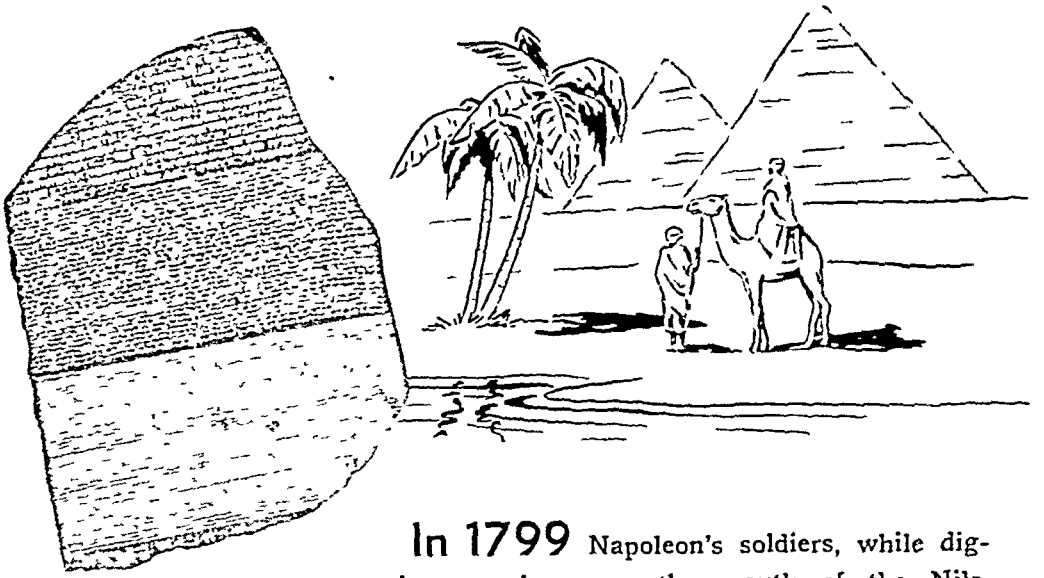
D T P
IPHTHERIA- ETANUS ERTUSSIS COMBINED
ALUM PRECIPITATED

THE NATIONAL DRUG COMPANY • Philadelphia 44, Pa.

PHARMACEUTICALS, BIOLOGICALS, BIOCHEMICALS *FOR THE MEDICAL PROFESSION*

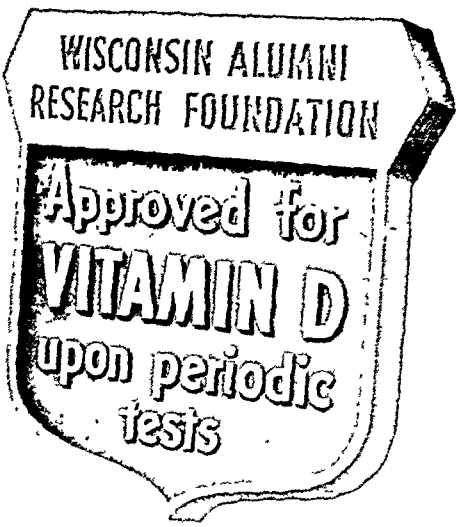
TABLE II. REACTIONS

VACCINE	INJECTION	TOTAL NO. INJECTIONS	LOCAL REACTIONS: ERYTHEMA (CM.) 0 (%)	<2.5 (%)	2.5–5 (%)	>5 (%)	INFILTRATION (CM.) 0 (%)	<2.5 (%)	2.5–5 (%)	>5 (%)	FEVER (%) NONE	SLIGHT (100°-102° F.)	HIGH (102°-104° F.)	OTHER REACTIONS (%) IRRITABILITY	VOMITING	ANOREXIA
Series A, plain DPT vaccine	A 0.1 c.c.	57	42	43	15	0	44	42	14	0	77	23	0	19	0	0
	1st 0.5 c.c.	107	46	39	15	0	48	40	12	0	72	21	7	24	3	6
	2nd 1.0 c.c.	97	76	20	4	0	76	20	4	0	81	12	7	19	1	4
	3rd 1.0 c.c.	85	86	13	1	0	85	14	1	0	91	7	2	5	0	1
Series B, alhydrox	1st 0.5 c.c.	105	48	37	14	1	43	41	15	1	67	24	9	22	5	7
	2nd 1.0 c.c.	96	63	27	10	0	53	37	10	0	65	25	10	25	7	4
	3rd 1.0 c.c.	88	63	37	0	0	58	41	1	0	79	13	8	11	6	1



In 1799 Napoleon's soldiers, while digging trenches near the mouth of the Nile, unearthed this strange "Rosetta" stone. The inscription was written in three different sets of characters—Greek, Egyptian, and an unknown third language. From this "key," scholars were able to decipher the strange inscription and thus discovered the meanings of ancient Egyptian writings.

MARKS WITH MEANINGS



In 1947 Many manufacturers use the Wisconsin Alumni Research Foundation Seal to attest the Vitamin D content of their products. The seal guarantees that these products are tested in the Foundation's Laboratories at regular intervals to make certain they measure up to its high standards and rigid requirements. For more than 15 years the medical profession has advised its patients, "Look for the Foundation Seal" when buying any product with Vitamin D content.

WISCONSIN ALUMNI *Research* FOUNDATION

MADISON 6, WISCONSIN

Finally, it should be mentioned that no effort was made to direct the needle downward, in giving the injection, as recommended by Sauer.[12] The vaccine was inoculated deep subcutaneously or intramuscularly, attention being paid to the avoidance of introduction of vaccine in the skin when passing through it, as suggested by Sako.[13]

RESULTS OF AGGLUTINATION TESTS FOR H. PERTUSSIS

1. *Series A.*—The results of the agglutinative tests for *H. pertussis* before and after immunization with plain DPT vaccine are shown in Table III. It will be noted that of the thirty-three children tested before immunization, eight (24.3 per cent) had agglutinin titers of more than 1:320. In fact, if one includes cases with titers lower than this, more than 50 per cent of the children tested had agglutinins against *H. pertussis.* This figure is not in agreement with the results of most investigators,[6, 9] although it corresponds to the findings of others.[14] This subject will be discussed in more detail later in this paper.

TABLE III. SERIES "A" (PLAIN DPT VACCINE) TITRATION OF SERUM AGGLUTININS AGAINST HEMOPHILUS PERTUSSIS

AGGLUTININ TITERS	NO. CASES		
	BEFORE IMMUNIZATION	1 MONTH AFTER IMMUNIZATION	6 MONTHS AFTER IMMUNIZATION
1:0	15 (45.4%)	7 (8.1%)	9 (13.0%)
1:50	5	1	2
1:100	1	1	1
1:200	4	3	3
Total cases without a protective titer	25 (75.7%)	12 (14.0%)	15 (21.7%)
1:400	1	9	7
1:800	2	7	6
1:1600	4	18	12
1:3200	1	40 (46.5%)	29 (42.0%)
Total cases with a protective titer	8 (24.3%)	74 (86.0%)	54 (78.3%)
Total cases in each group	33	86	69

One month after completion of the course of injections, 86 per cent of the children tested had an agglutinin titer of more than 1:320, a level which is believed to afford complete protection. Almost half of the group tested (46.5 per cent) had agglutinins in the very high titer of 1:3,200 or more. While susceptibility is not present in the presence of agglutinins in high titer, 1:320 or more, immunity may exist in the absence of agglutinins [8, 9] and a substantial number of subjects with low agglutinin titers are found to be immune when exposed to whooping cough. Since some of the children with low or no agglutinin titers are therefore not susceptible to infection, this may be estimated to bring the total protected to approximately 90 per cent, which is the maximum obtainable with any type of vaccination.[5] The results obtained in the vaccination of this series of children should, therefore, be considered satisfactory.

COMPARE THIS INFANT CEREAL WITH ANY OTHER!

For ingredients... Clapp's Instant Cereal is made from the following ingredients: whole wheat meal, corn meal, wheat germ, malt, nonfat dry milk solids, calcium phosphate, dried brewers' yeast, salt, and iron ammonium citrate.

For nutritional values... 1 oz. serving of Clapp's Instant Cereal furnishes the following percentages of the minimum daily requirements:

For infants, vitamin B_1—120%, vitamin B_2—20%.

For young children, vitamin B_1—60%, Iron—113%, Calcium—32%, Phosphorus—22%.

(The essential Calcium, Phosphorus, and Iron requirements of infants, and the vitamin B_2 requirements of children have not been established.)



Typical Analysis of Clapp's Instant Cereal

Carbohydrate 73.1%	Iron (Fe) 30 mg. per 100 gm.
Protein (Nx6.25) 15.0%	Copper (Cu) 2 mg. per 100 gm.
Fat (ether extract) .8%	Thiamine (B_1) 1.0 mg. per 100 gm.
Ash (total minerals) 3.8%	Riboflavin (B_2) 0.3 mg. per 100 gm.
Crude Fiber 1.6%	Moisture 5.7%
Calcium (Ca) 800 mg. per 100 gm.	Calories per ounce 102.
Phosphorus (P) 580 mg. per 100 gm.	

For taste ... When mothers report a "Cereal Problem," suggest a change to Clapp's. Infant cereals vary widely in flavor. The sweet, nutty flavor of Clapp's is one most babies love.

For texture . . . The fine, but definite, texture of Clapp's Baby Cereals is readily accepted by babies. This texture, marking a distinct advance over a liquid diet, prepares the infant for later progress to solid food.

• • •

The Council on Foods of the A.M.A. suggests that infants' cereals may well be selected upon the basis of furnishing vitamin B_1 and Iron. Both Clapp's Instant Cereal and Clapp's Instant Oatmeal are excellent sources of these two food elements.

CLAPP'S BABY CEREALS



PRODUCTS OF AMERICAN HOME FOODS

For generous professional samples—mail this coupon

CLAPP'S BABY FOOD DIVISION, D-9
American Home Foods, Inc., P. O. Box 164,
Canal Street Station, New York 13, N. Y.

Please send me a supply of professional samples of Clapp's Instant Cereal and Clapp's Instant Oatmeal.

Name_____

Address_____

City_____ State_____

In comparing the two series, analysis of the agglutinative titers obtained one month and six months after immunization shows that there is no significant difference between the numbers of cases with a titer of 1:320 or more. The same can be said about children with titers of 1:3,200 or more.

In conclusion, the results of immunization against pertussis are equally satisfactory in both series, as proved by the percentage of titers of 1:320 or more. In view of the fact that half the dose of *H. pertussis* was administered in the immunization with "alhydrox" as compared with plain DPT vaccine (see Table I), we must conclude, on the basis of our results, that the former is superior to the latter as an immunizing agent against *H. pertussis*. Moreover, it should be pointed out that the total dose of 50 billion organisms used in our "B" series is below the minimal amount advocated by other authors.[3, 11]

RESULTS OF TITRATION OF DIPHTHERIA ANTITOXIN

1. *Series A.*—The results of titrations of diphtheria antitoxin before and after immunization with plain DPT vaccine are shown in Table V. Of the thirty-three patients tested before immunizaton, only three had a titer of 0.03 unit per cubic centimeter or more. It should be kept in mind, however, that 0.03 unit, the minimum titer tested for, is much more than is needed to produce Schick negativity. In all probability, therefore, a larger number of children than indicated by our figures were Schick negative before immunization. Schick tests were not carried out at this time, lest the injection of skin test material act as an antigen and thus confuse the interpretation of the experimental vaccination.

TABLE V. SERIES "A" (PLAIN DPT VACCINE) TITRATION OF DIPHTHERIA ANTITOXIN

ANTITOXIN LEVELS (UNITS PER C.C.)	NO. CASES		
	BEFORE IMMUNIZATION	1 MONTH AFTER IMMUNIZATION	6 MONTHS AFTER IMMUNIZATION
Total patients without a protective titer (<0.03 unit per c.c.)	31 (90.9%)	0	9 (13.0%)
0.03	–	1	–
>0.03 <0.1	1	–	6
0.1	1	5	1
>0.1 <1.0	–	19	17
1.0	–	10	12
>1.0	–	51 (59.3%)	24 (34.7%)
Total cases with a protective titer	3 (9.1%)	86 (100%)	60 (87.0%)
Total cases in each group	33	86	69

One month after completion of the course of injections all cases tested had an antitoxin level of 0.03 unit or more, and fifty-one (59.3 per cent) out of a total of eighty-six a high titer of more than 1.0 unit per cubic centimeter. The results of vaccination against diphtheria with plain DPT vaccine are to be considered highly satisfactory.

Five months later, six months after completion of the immunization, the proportion of cases with a titer of 0.03 units or more had dropped from 100 to 87 per cent, a difference which is to be considered highly significant and not due

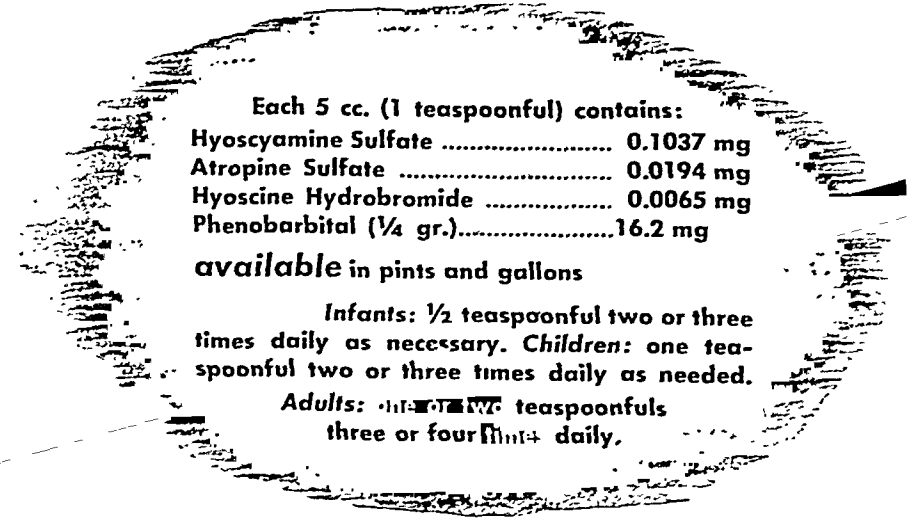
An Outstanding Spasmolytic and Sedative Now Available in Liquid Form

Already well known for its wide range of therapeutic usefulness in smooth muscle spasm, Donnatal 'Robins' now considerably increases its field of applicability with the introduction of the new, unique Donnatal Elixir.

Highly palatable—Donnatal Elixir will fill a long-felt need in pediatric practice, in cases of pyloric stenosis, intestinal colic, diarrhea, and enuresis. Or, whenever Donnatal 'Robins' is indicated, the Elixir may be used in place of the Tablets—each 5 cc. (1 teaspoonful) providing the therapeutic effect of 1 tablet. The liquid form allows for individualized posology, and is also preferred by some adult patients to tablet medication.

A.H. Robins Company, Richmond 19, Va.

Ethical Pharmaceuticals of Merit since 1878



DONNATAL elixir / Robins

THE UNIQUE SPASMOLYTIC AND SEDATIVE ELIXIR

TABLE VI. SERIES B (ALHYDROX) TITRATION OF DIPHTHERIA ANTITOXIN

ANTITOXIN LEVELS (UNITS PER C.C.)	NO. CASES		
	BEFORE IMMUNIZATION	1 MONTH AFTER IMMUNIZATION	6 MONTHS AFTER IMMUNIZATION
Total cases without a protective titer (<0.03 unit per c.c.)	67 (81.7%)	1 (1.5%)	0
0.03	8	–	1
>0.03 <0.1	4	1	5
0.1	2	1	1
>0.1 <1.0	1	4	27
1.0	–	6	13
>1.0	–	69 (84.1%)	33 (41.2%)
Total cases with a protective titer	15 (18.3%)	81 (98.5%)	80 (100%)
Total cases in each group	82	82	80

TABLE VII. SERIES A (PLAIN DPT VACCINE) TITRATION OF TETANUS ANTITOXIN

ANTITOXIN LEVELS (UNITS PER C.C.)	NO. CASES		
	BEFORE IMMUNIZATION	1 MONTH AFTER IMMUNIZATION	6 MONTHS AFTER IMMUNIZATION
<0.01	32	0	0
>0.01 <0.1	1	0	0
Total cases without a protective titer (<0.1 unit per c.c.)	33 (100%)	0	0
0.1	–	–	1
>0.1 <1.0	–	2	7
1.0	–	3	8
>1.0	–	81 (94.1%)	53 (76.8%)
Total cases with a protective titer	0	86 (100%)	69 (100%)
Total cases in each group	33	86	69

The results of immunization against diphtheria are satisfactory in both groups. As we have pointed out, six months after immunization there was no decline in the total number of children with protective titers in the "B" series as compared with a clear-cut drop in the "A" series. On this basis, one might say that alhydrox is a better immunizing agent against diphtheria than the plain DPT vaccine. On the other hand, as we have said, the number of cases with a titer of more than 1.0 unit per cubic centimeter decreased much more markedly in the "B" series than in the "A" series in the five-month interval between testing. This finding makes one suspect that, in the long run, the results with both immunizing agents would even out eventually and thus be closely comparable.

RESULTS OF TITRATION OF TETANUS ANTITOXIN

1. *Series A.*—The levels of tetanus antitoxin in the serum of children before and after immunization with plain DPT vaccine are tabulated in Table VII. Before immunization, all children tested had titers below the protective level. This is as expected, for tetanus antitoxin does not occur normally in the blood of human beings.[15]

The Journal of Pediatrics

VOL. 31 SEPTEMBER, 1947 NO. 3

Original Communications

COMBINED IMMUNIZATION AGAINST DIPHTHERIA, TETANUS, AND PERTUSSIS IN CHILDREN OVER THREE MONTHS OF AGE: INCLUDING AN EVALUATION OF THE EFFECTIVENESS OF TWO IMMUNIZING AGENTS

PAUL A. DI SANT' AGNESE, M.D.
NEW YORK, N. Y.

SIMULTANEOUS injection of three or more antigens has been advocated by Ramon[1] for a number of years. In this country Lapin[2, 3] and Daughtry-Denmark[4] were the first to use combined immunization against diphtheria, tetanus, and pertussis. Since then, "triple combined immunization" has come into general use, and a number of commercial preparations are now available.

The object of this investigation is to evaluate the effectiveness of two immunizing agents by serial titrations of the serum levels of tetanus and diphtheria antitoxin and of serum agglutinins for *Hemophilus pertussis*. It is further desired to compare the incidence and severity of reactions to injections of these two immunizing agents.

The two preparations* used were: (1) fluid diphtheria and tetanus toxoids with 40 billion *H. pertussis* added per cubic centimeter,† and (2) aluminum hydroxide-adsorbed diphtheria and tetanus toxoids with 20 billion *H. pertussis* added per cubic centimeter.‡ Miller has previously reported on the use of alhydrox.[5]

PLAN OF THE EXPERIMENT

The children included in the investigation were divided into two groups as alike as possible in age, sex, and color. To one group, *Series A*, plain DPT vaccine was given; the other group, *Series B*, received alhydrox. The age distribution is shown in Fig. 1. In the "A" series there were sixty-three females and fifty-five males; in the "B" series, fifty-two females and fifty-three males. In Series A there were seventy-six white and forty-two Negro children; in Series B there were fifty-six white, forty-eight Negro and one Chinese.

From Babies Hospital, Vanderbilt Clinic, and the Department of Pediatrics, Columbia University.

Supported by a grant from Cutter Laboratories, Berkeley, Calif.

*Kindly supplied by Cutter Laboratories, Berkeley, Calif.

†Referred to hereafter as "plain DPT vaccine."

‡Referred to hereafter as "alhydrox."

tinins before immunization. Adams and Kimball[17] of Minneapolis found that 23 per cent of the cord bloods they tested showed the presence of agglutinins in titers of 1:20 to 1:180.

Two facts stand out from this brief and admittedly incomplete review of the literature: there is a lack of sufficient data on pre-immunization agglutinative titers in the literature, and there is considerable disagreement among the findings of various authors. This leads one to believe that there is either a difference in the rate of exposure to pertussis in different parts of the United States or that the agglutination tests do not give consistent results in the hands of different laboratories. Probably both factors are involved.

It must be admitted, however, that in our two series the frequency of subjects showing the presence of agglutinins before immunization exceeds that of most other reports. Only Waddel and L'Engle[14] have had a comparable experience: 73 per cent of their twenty-two cases tested at one week of age had agglutinins in the serum. Of the twenty-two cases, eight (37 per cent) had titers of more than 1:320. As the titrations of agglutinins in their study were also done by the Cutter Laboratories, it is reasonable to suspect that the pre-immunization results obtained in our cases by the Cutter modification of the Miller technique were too high. This suspicion is borne out by the fact that subsequent titrations, carried out by the same laboratory according to the method of Flosdorf and (what is probably more important) with a fresh antigen, showed the absence of pre-immunization agglutinative titers in almost all of a group of newborn infants tested.[18]

It might be reasonably assumed that children of more than 6 months of age showing the presence of agglutinins before immunization had been previously exposed to *H. pertussis* or some of its antigens. An analysis of the cases with pre-immunization titers reveals, however, that the number of such children that responded to immunization with a high agglutinin titer (more than 1:1,600) does not differ significantly from the percentage of children with high post-immunization titers found for the whole series. No conclusion can be drawn as to the rate of exposure of subjects with pre-immunization agglutinin titers.

In eight cases the agglutinative titer present before immunization decreased on subsequent examination. In two instances, the infants 6½ and 7½ months of age, the titers were found to have decreased progressively from those before immunization at each examination so as to reach a titer of 1:0 six months after completion of the immunizing series. In both of these cases the presumption that the initial titer was due to passive transfer of antibodies from the mother to the child is strongly founded. In a third case, only 6 weeks of age, the same conclusion can apply. In the remaining five cases the presence of agglutinins before immunization is more difficult to explain and the possibility of self-agglutinating cultures must be considered.

2. *Patients with "Protective" Agglutinative Titers Against H. pertussis After Immunization.*—All of the blood samples obtained six months after immunization in the "B" series and thirty-four of sixty-nine specimens collected at the same time interval in the "A" series were tested for pertussis agglutinins

AGGLUTININ AND ANTITOXIN LEVELS CONSIDERED PROTECTIVE

An agglutinin titer of 1:320 against *H. pertussis* has been considered in this study as a satisfactory immune antibody level. It has been shown by Miller[5] and more recently by Sako,[9] that 100 per cent of patients having this titer or more of serum agglutinins have clinical protection against intimate exposure to whooping cough. Hereafter, children having a titer of 1:320 or more will be referred to as having a protective level of antibodies. Those having less than this level of serum agglutinins will be considered as not having a titer sufficient for protection against pertussis.

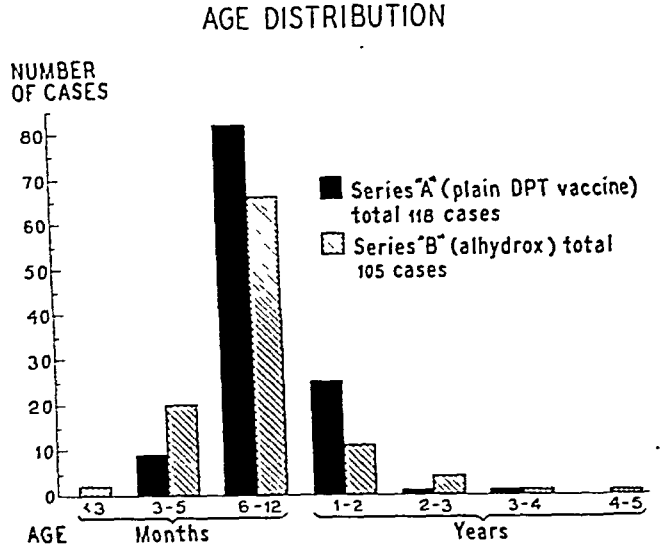


Fig. 1.

A level of 0.03 unit or more of diphtheria antitoxin per cubic centimeter was considered as affording complete protection to the individual. Titrations were not carried out below this level. It should be noted that the minimum level tested for is in reality seven and a half times as great as the 0.004 units per cubic centimeter generally accepted as sufficient to induce Schick negativity in the average individual.[10]

In the case of tetanus antitoxin the minimum level tested for was 0.01 unit per cubic centimeter. A titer of 0.1 unit per cubic centimeter has been generally considered protective against infection by *Clostridium tetani*.[6, 11]

LOCAL AND GENERAL REACTIONS TO IMMUNIZATION

In Table II are tabulated the local and general reactions to 635 injections in the two series of cases. Almost no severe local reactions were observed. From 0 to 10 per cent of cases in the various groups experienced temperatures of more than 102° F. In no case did the temperature go above 104° F. The "high fevers" generally ranged between 102° and 103° F. In one instance the

SUMMARY AND CONCLUSIONS

1. The response of children of more than 3 months of age to combined immunization against diphtheria, tetanus, and pertussis was studied by means of serum agglutinin and antitoxin determinations before and at various intervals after immunization. Two immunizing agents were used: fluid diphtheria and tetanus toxoid with 40 billion *H. pertussis* added per cubic centimeter (plain DPT vaccine) and aluminum hydroxide-absorbed diphtheria and tetanus toxoids with 20 billion *H. pertussis* added per cubic centimeter (alhydrox).

2. In 635 injections of the two immunizing agents, it was found that the systemic and local reactions to the two preparations did not differ significantly. It was noted that the type and intensity of the local reactions did not depend on the size of the injection, but decreased with subsequent inoculations. Constitutional reactions were not severe and no sterile abscesses requiring drainage were observed.

3. The postimmunization titers were satisfactory in both series of cases. It was felt that alhydrox was a better immunizing agent against pertussis than plain DPT vaccine because equally good results were obtained with half the dose of *H. pertussis.* In the case of diphtheria and tetanus, alhydrox was also found to give better results. The antitoxin titers obtained with this agent were higher and more enduring than those observed after injection of the plain DPT vaccine.

4. A review of the literature reveals that there is a dearth of data concerning pre-immunization agglutinative tests and a considerable discrepancy among the results of various authors. The agglutinin titers against *H. pertussis* before immunization in our cases were higher than those of most other reported series. This may have been due to technical factors in the agglutinative tests. When the antigen and the method were later changed, our results conformed more nearly with those reported in the literature.

5. The postimmunization pertussis agglutinative titers are to be considered reliable because most of the blood samples obtained six months after immunization were tested with a fresh antigen.

6. Some instances of "poor immunizers" who failed to develop adequate agglutinin or antitoxin titers are recorded.

7. No relation was found between systemic reactions to inoculation and the development of high antibody or antitoxin titers.

We wish to acknowledge the assistance of Mrs. Ruth H. Silverman, R.N., in carrying out this study. We are greatly indebted to Mr. R. B. Clark, Supervisor of Clinical Research, Cutter Laboratories, Berkeley, Calif., for his ready cooperation and friendly assistance.

REFERENCES

1. Ramon, G.: Mixed Vaccinations, Internat. Clin. 1: 241, 1939.
2. Lapin, J. H.: Combined Immunization of Infants Against Diphtheria, Tetanus and Whooping Cough, Am. J. Dis. Child. 63: 225, 1942.
3. Lapin, J. H.: Mixed Immunization in Infancy and Childhood, J. PEDIAT. 22: 439, 1943.
4. Daughtry-Denmark, L.: Whooping Cough Vaccine, Am. J. Dis. Child. 63: 453, 1942.
5. Miller, J. J., Humber, J. B., and Dowrie, J. O.: Immunization with Combined Diphtheria and Tetanus Toxoids (Aluminum Hydroxide Adsorbed) Containing *Hemophilus pertussis* Vaccine, J. PEDIAT. 24: 281, 1944.

second injection of "alhydrox" was followed by a temperature of 104° F. and convulsions. This child, a Negro boy 2 years of age, was admitted to Babies Hospital. Examination of the spinal fluid was entirely negative, the fever subsided within twenty-four hours, and the patient was discharged in good health the day after admission. A subsequent injection of the same material failed to produce a febrile response. It was felt that the child reacted to the high temperature with convulsions and that this response of the central nervous system could not be attributed directly to the inoculation of vaccine. It might be added that the febrile reactions usually appeared at about twelve to twenty-fours hours after injection and lasted an average of twelve to twenty-four hours.

In all patients, erythema and induration usually became apparent at the site of injection within twelve to twenty-four hours and lasted an average of forty-eight hours. In the majority of subjects receiving alhydrox, a small, deep, nonpainful nodule was palpable at the site of inoculation for several weeks. There were no abscesses, sterile or otherwise, requiring drainage; but in one instance after the third injection of alhydrox, a fluctuating area of probable necrosis appeared at the site of injection. This area eventually disappeared without drainage. Nine patients of Series A and six of Series B complained of "sore arms," even though other signs of local inflammation were not especially severe.

Among the reactions other than those just described, irritability, vomiting, and anorexia were the most common. In three instances there was a complaint of mild diarrhea after an injection of vaccine. This may well have been coincidental. In one case generalized hives developed the day after injection, but this manifestation responded readily to an injection of adrenalin.

Several interesting observations can be made from an analysis of Table II:

1. There was very little difference between the two series of cases in the percentage of reactions.

2. The type and intensity of the local reactions did not depend on the amount of vaccine given. In Series A, fifty-seven patients were given a first injection of 0.1 c.c. of the plain DPT vaccine (designated "injection A" in Table II); no significant difference could be seen in the number and type of local reactions to this small dose as compared with other larger injections.

3. The number and severity of the reactions decreased in both series with subsequent injections.

Inspection of the data also reveals that reactions in a single case are entirely unpredictable. It is not possible to predict the response to an injection of vaccine on the basis of previous experience in the same child. The cases in this study were selected only as to age, hence several children with allergic manifestations were included. We are not aware of a difference in response to inoculation between this group and nonallergic children, a fact which is in accord with statements made by other observers.[11]

MYOCARDIAL INFARCTION IN THE NEWBORN INFANT

ROBERT M. RAVICH, M.D., AND PHILIP ROSENBLATT, M.D.
BROOKLYN, N. Y.

AN INTENSIVE search of the literature has failed to disclose any descriptions of myocardial infarction in the newborn infant, and only four instances in infancy. Ramsay and Crumrine[1] described the case of a 4-month-old female infant with thrombosis of the descending branch of the left coronary artery and resultant myocardial infarction. Ellis[2] reported a case in which there were several old infarcts associated with an aneurysm of the left ventricle in a 9-month-old hydrocephalic infant. Hughes and Perry[3] reported coronary thrombosis in an infant 7 weeks of age, and, most recently, Scott and Miller[4] described it in an 11-month-old infant. Our patients were aged 2 days and 10½ hours, respectively, and represent myocardial infarction in the newborn infant.

CASE HISTORIES

CASE 1.—A male Negro infant was delivered Sept. 25, 1945, spontaneously at term of a 28-year-old uniparous mother, at the Jewish Hospital of Brooklyn. The course of pregnancy had been entirely uneventful. The first stage of labor lasted 10½ hours and the second stage 25 minutes. Slight difficulty was encountered in delivering the shoulders and the vernix was stained yellow. At birth the child weighed 8 pounds, 2 ounces, its condition was good, and physical examination immediately after birth revealed no abnormalities. On the second day of life the child vomited green material on two occasions but thereafter took two feedings without any apparent difficulty. Two hours after the last feeding, and sixty-six hours after birth, the infant expired suddenly and unexpectedly.

The hemoglobin shortly after birth was 94 per cent with 2 erythroblasts per 100 white blood cells. The Rh factor of both mother and child was positive. The mother's blood Wasserman during pregnancy and after delivery was negative, although two years previously she had received a course of injections for syphilis.

Post-mortem Examination.—Post-mortem examination performed five hours after death revealed the following: There was no unusual amount of fluid in any of the serous cavities. The heart was markedly enlarged and weighed 47 Gm. (normal, 17 Gm.). The enlargement was principally right-sided and the right auricle and ventricle were dilated. The right and left ventricular walls were of equal thickness, both measuring 0.7 cm. The valves were delicate and the foramen ovale and ductus arteriosus were patent. The coronary ostia were patent, and the coronary vessels followed a normal course and were patent as far as they could be traced. The myocardium was red-brown except for an irregular area of bluish discoloration of the interventricular septum measuring 0.8 cm. in greatest diameter.

The lungs were buoyant and there were widespread areas of atelectasis.

The liver was congested and weighted 158 Gm. (normal, 78 Gm.).

The pancreas weighed 15 Gm. (normal, 2 Gm.) and was unusually firm.

The spleen was soft, congested, and the Malpighian corpuscles were prominent.

The mesenteric lymph nodes were enlarged.

The gastrointestinal tract, genitourinary tract, adrenals, and brain showed nothing remarkable.

From the Department of Laboratories, Division of Pathology, The Jewish Hospital of Brooklyn.

If the agglutinin titers obtained at one month and six months after completion of immunization are compared, it will be seen that there has been no significant drop in the five-month period. Indeed, if figures for the total number of patients with a protective titer at one month and six months after immunization are analyzed statistically, it is found that the variation in the figures may be readily accounted for by chance alone ($\chi^2 = 0.9179$, $P = .35$). The same is true of the patients with a titer of 1:3,200 or more ($\chi^2 = 0.0478$, $P = 0.85$).

2. *Series B.*—The serum agglutinin titers obtained before and after immunization with alhydrox are given in detail in Table IV. Remarks made about preimmunization titers in children of Series A apply also to the subjects in this group.

TABLE IV. SERIES B (ALHYDROX) TITRATION OF SERUM AGGLUTININS AGAINST HEMOPHILUS PERTUSSIS

AGGLUTININ TITERS	NO. CASES		
	BEFORE IMMUNIZATION	1 MONTH AFTER IMMUNIZATION	6 MONTHS AFTER IMMUNIZATION
1:0	40 (48.2%)	4 (4.8%)	10 (12.5%)
1:50	13	2	0
1:100	6	2	1
1:200	12	4	3
Total cases without a protective titer	71 (86.6%)	12 (14.6%)	14 (17.5%)
1:400	3	9	4
1:800	3	8	10
1:1600	3	22	15
1:3200	2	31 (37.8%)	37 (46.2%)
Total cases with a protective titer	11 (13.4%)	70 (85.4%)	66 (82.5%)
Total cases in each group	82	82	80

One and six months after immunization, more than 80 per cent of the children tested had a titer of more than 1:320, about 40 per cent a titer of 1:3,200 or more. Inspection alone reveals that at the end of the two periods of time there is no difference between the total numbers of cases showing a titer of more than 1:320. Analysis by statistical methods reveals that the difference between the numbers of children with a titer of 1:3,200 or more is more apparent than real and can be accounted for by sampling error ($\chi^2 = 1.442$, $P = 0.25$). The remarks made about the total number of children presumably protected after immunization apply equally to this group of patients.

3. *Comparison between Series A and B.*—If the data in Tables III and IV are analyzed, it will be seen first that the results of the agglutinative tests *before immunization* are directly comparable in the two series. While the number of children tested is greater in Series B, the proportion of cases showing the presence of agglutinins is a little over 50 per cent in each series. The number of children with preimmunization titers of 1:320 or more is also not significantly different ($\chi^2 = 0.972$, $P = 0.40$).

CASE 2.—This white male infant was born at term on Jan. 12, 1946, at the Jewish Hospital of Brooklyn. The mother was a 42-year-old gravida V, para ii. The first child died within twenty-four hours of birth of unknown cause. The second and fourth pregnancies were terminated by early miscarriages. The third child is living, although at 6 months of age, a retinal glioma of the left eye was found, and the eye was enucleated. The mother and father are both Rh positive and the maternal blood Wassermann is negative.

The present pregnancy was uneventful. The mother was admitted with ruptured membranes and mild irregular pains. Rectal examination revealed a double footling breech presentation. On the day following admission pituitrin was administered in six divided doses of one minim each, given at twenty-minute intervals in an effort to stimulate labor. This was partly successful, and produced mild uterine contractions which occurred every five minutes. Two hours later three additional 1 minim dose of pituitrin were given at twenty-minute intervals. Two minutes before delivery, the fetal heart, which until that time had been regular at a rate of 140 beats per minute, could not be heard. An assisted breech delivery was performed a few minutes after the final dose of pituitrin. A Mariceau-Smellie-Viet maneuver was performed to deliver the aftercoming head. The first and second stages of labor lasted a total of four hours, twenty minutes.

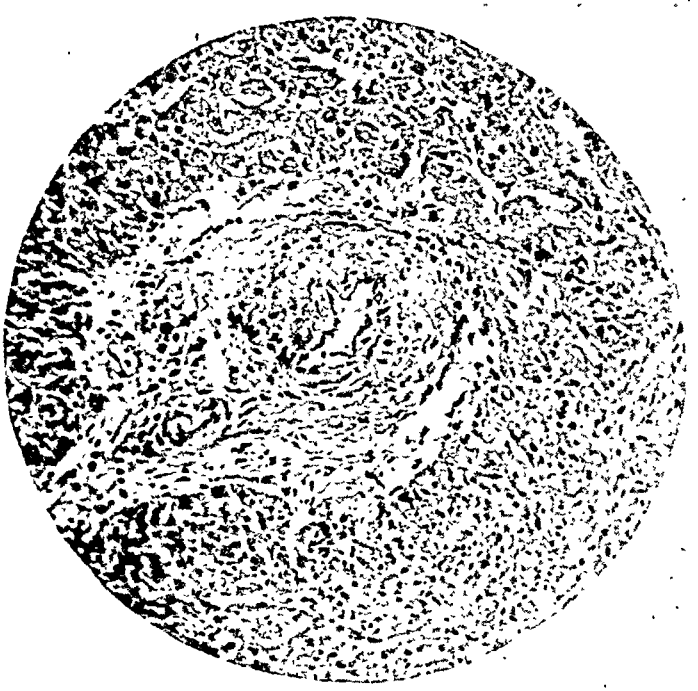


Fig. 1.—(Case 1.) Section of left ventricle showing artery with thickened media and perivascular infiltration of round cells. H and E ×112.

The condition of the child at birth was very poor. The infant was cyanotic, the respirations were absent or depressed, but the heart action was regular. The child weighed 4 pounds, 8 ounces. Oxygen was administered for one hour. A thin, foamy material had to be aspirated from the trachea. The respirations remained inadequate, there was intercostal retraction, and the lungs were atelectatic. Ten and one half hours after birth the infant expired.

to chance in sampling ($\chi^2 = 9.643$, $P = <0.01$). There was also a drop in the number of children with a titer of more than 1.0 units per cubic centimeter, which, while statistically less impressive, is, nevertheless, within the limits of significance ($\chi^2 = 4.861$, $P = 0.03$). A drop in titer is expected, for it is known that the diphtheria antitoxin content in blood of immunized subjects slowly decreases with the passage of time.[15]

Three of the nine children found at this time to have antitoxin levels of less than 0.03 unit per cubic centimeter were Schick tested shortly afterward, and all had negative tests. Among twenty-one subjects whose serum antitoxin titer was 0.03 unit or more per cubic centimeter six months after the completion of their immunizing course, Schick tests were uniformly negative, as was to be expected.

2. *Series B.*—The levels of diphtheria antitoxin obtained before and after immunization with alhydrox are detailed in Table VI. Of eighty-three children tested before immunization, sixteen (18.3 per cent) had antitoxin titers of 0.03 unit per cubic centimeter or more. A greater number, undoubtedly, were Schick negative, but skin tests were withheld at this time for reasons already given. The results of immunization, as can be seen, were highly satisfactory both one month and six months after completion of immunization. One child, who had failed to develop a titer of 0.03 unit per cubic centimeter of antitoxin one month after immunization, had developed a level of more than 1.0 unit per cubic centimeter when retested five months later.

While there was no difference at one month and six months postimmunization in the total number of patients showing protective levels, there was a drop in the number of those with an antitoxin level of more than 1.0 unit per cubic centimeter from 84 to 41 per cent. If these figures are analyzed, the difference is found to be highly significant and due to some factor other than chance ($\chi^2 = 31.598$, $P = «0.01$).

Schick tests carried out on "B" subjects after the six months' postimmunization blood samples had been collected were uniformly negative.

3. *Comparison Between Series A and B.*—If Tables V and VI are compared, it will be noted that in Series B there was a greater percentage of children with protective titers before immunization. While this difference is not great and could be due to chance alone ($\chi^2 = 2.522$, $P = 0.12$), it can be explained readily by the higher percentage of children below 6 months of age in Series B (Fig. 1).

Analysis of data obtained one month postimmunization reveals no real difference between the percentage of patients with a protective titer in the two series. Six months after immunization, the percentage of children in *Series B* showing protective levels of antitoxin is significantly higher than in Series A ($\chi^2 = 8.926$, $P = <0.01$).

At one month after immunization, the percentage of "B" patients with an antitoxin level of more than 1.0 unit per cubic centimeter is significantly higher than of the "A" cases. But five months later there is no significant difference between the two groups ($\chi^2 = 0.0006$, $P = 0.98$), a sharper decline having occurred in the high titers in the "B" series.

walls are not thickened. A few small petechial hemorrhages are also seen in places distant from the infarct

Lungs.—Very few of the alveoli are aerated and the bronchioles are collapsed. Many alveoli are filled with an amorphous pink staining material, red blood cells, and brown pigment granules. Large macrophages containing pigment are also seen. The vessels are distended but are otherwise not remarkable.

Anatomic Diagnosis.—Thrombi in coronary arteries and veins; myomalacia cordis; congestion of viscera



Fig. 3.—(Case 2) View of posterior surface of heart and lungs showing the large area of hemorrhagic infarction with central necrosis

DISCUSSION

In recent years it has become increasingly apparent that coronary artery disease with myocardial damage is not confined to the older age groups. In 1927, White and Mudd[5] discussed 418 cases of coronary thrombosis, 3 per cent of which occurred in patients under the age of 40. In 1942, Reitman, Greenwood and Kler[6] summarized the literature and described 221 cases of coronary thrombosis in individuals less than 40 years of age. Thirty-four of these occurred in patients under the age of 30. French and Dock[7] in 1944 reviewed 100 autopsies performed during World War II on American soldiers 20 to 36 years of age in whom coronary sclerosis was found to be the cause of death. Zacks[8] collected 8 cases, and added one of his own, of coronary thrombosis with myocardial infarction occurring during the second decade of life.

As has previously been noted, coronary thrombosis in the very young is extremely uncommon and only four instances were found in the literature. The usual causes of coronary artery disease are very rare in infancy, although Guild and associates[9] have collected twenty-two cases of coronary artery disease in childhood. Furthermore, despite the occurrence of congenital coronary artery

After immunization, all patients showed antitoxin levels above the protective level, and the majority showed a high titer of more than 1.0 unit per cubic centimeter. The drop in the number of children with high titers in the interval between one and six months after immunization is statistically significant ($\chi^2 = 8.439$, $P = <0.01$). This is to be expected, for it is known that the levels of tetanus antitoxin decrease gradually with the passage of time.[15]

2. *Series B.*—The levels of tetanus antitoxin before and after immunization with alhydrox are detailed in Table VIII. None of the children tested before immunization had protective levels of tetanus antitoxin, while 100 per cent produced levels of more than 0.1 unit per cubic centimeter after immunization. Especially interesting is the high level of antitoxin in more than 90 per cent of the subjects at both one and six months after immunization.

TABLE VIII. SERIES B (ALHYDROX) TITRATION OF TETANUS ANTITOXIN

ANTITOXIN LEVELS (UNITS PER C.C.)	NO. CASES		
	BEFORE IMMUNIZATION	1 MONTH AFTER IMMUNIZATION	6 MONTHS AFTER IMMUNIZATION
<0.01	82	0	0
>0.01 <0.1	0	0	0
Total cases without a protective titer (<0.1 unit per c.c.)	82 (100%)	0	0
0.1	–	–	1
>0.1 <1.0	–	3	1
1.0	–	1	5
>1.0	–	78 (95.1%)	73 (91.2%)
Total cases with a protective titer	0	82 (100%)	80 (100%)
Total cases in each group	82	82	80

3. *Comparison of Series A and B.*—When the data in Tables VII and VIII are compared, it will be seen that the results of immunization against tetanus are satisfactory in both series. While in Series A the number of children with a titer of more than 1.0 unit per cubic centimeter dropped from 94 per cent one month after immunization to 77 per cent five months later, there was no change in the number of cases with a titer of 1.0 unit per cubic centimeter in the "B" series. On the basis of this fact it must be concluded that alhydrox is a better immunizing agent against tetanus than the plain DPT vaccine.

DISCUSSION

1. *Patients With "Protective" Agglutinin Titers Against H. pertussis Before Immunization.*—The most controversial feature of the findings we have described in this paper is the high percentage of children showing agglutinative titers against *H. pertussis* before immunization. In a report made by Miller[6] the proportion of patients showing agglutinins before immunization was 10 per cent, and in no case was the titer more than 1:160. In Sako's recent paper[9] it is stated that the pre-immunization agglutinative tests were negative in all of the 8,600 children included in his investigation. In a recent paper of DeGara and Mayer[16] only one out of seventeen children showed the presence of agglu-

The first case presented might have been overlooked, because although sections were taken through the area of discoloration in the septum the possibility of an infarct was not considered until the histologic sections were seen. The most probable pathogenesis in this case was intrauterine infection of fairly long standing which affected the small arteries of the heart and lung and also resulted in a fibrosing pancreatitis. It must be noted, however, that there was no history of any serious illness in the mother during pregnancy. The Wassermann test for syphilis was negative on two occasions and although the pancreatic lesions superficially resembled those of syphilis, no other manifestations of congenital syphilis were present in the skin, lungs, liver, spleen, or bones. Without characteristic involvement of any of these organs, a diagnosis of syphilis was felt to be untenable. Furthermore, special stains of the viscera failed to reveal spirochetes. The enlargement of the heart in this case was quite pronounced and can probably be explained on the basis of ischemia due to the narrowing of the lumina of the smaller arteries and arterioles. Support is lent to this view by Davis and Blumgart[15] and others who believe that cardiac hypertrophy is not necessarily due to an increased load upon the heart but may be the result of "impaired nutrition of the muscle fibers which causes them to undergo stretching and consequent hypertrophy."

There was no doubt on gross examination of our second case that we were dealing with a very recent hemorrhagic infarct of the heart. None of the other tissues contained hemorrhagic areas so that there was nothing to indicate that this was a local manifestation of hemorrhagic disease of the newborn. Furthermore, no cases of this disease have been reported in which the myocardium was involved. The Rh studies were noncontributory. The pathogenic process in this case is quite obscure. Several possible explanations must be considered, however. The pressor and oxytocic fractions of the posterior pituitary gland extracts used in obstetrical practice cannot be completely separated from one another. The pressor substance of the gland causes vasoconstriction of the coronary vessels.[14] Undoubtedly this substance administered to the mother also enters the fetal circulation. Excessive retardation of blood flow in the conorary circulation may have been produced, resulting in thrombosis of the blood vessels. Another possibility is that the forceful uterine contractions brought about by the administration of pituitrin may have produced too great a pressure on the after-coming head. This may have caused an increase in the intracranial pressure leading to vasoconstriction. A small amount of blood-tinged fluid was present in the cranial cavity. Direct trauma to the precordium during labor or delivery cannot be excluded.

SUMMARY

Two cases of myocardial infarction occurring in the neonatal period are presented. This condition has not been previously described in newborn infants. It is possible that such a lesion may be present and yet be unnoticed at autopsy examination.

by the Flosdorf method and with a fresh antigen. As previously pointed out, there was no decline in the agglutinin titers between one and six months after immunization in either series. This leads to the obvious inference that the results of all of the postimmunization agglutinative tests are to be considered reliable. In addition, the agglutinin titers obtained by Miller[5] after immunization with alhydrox checked very closely with ours.

3. *"Poor Immunizers."*—If the cases showing an agglutinative titer of less than 1:320 at either one month or six months after immunization are considered, it is found that in most instances the agglutinin titers were low at both times. In other words, these children were poor producers of agglutinins against *H. pertussis*. It does not follow, as we have previously mentioned, that these same individuals were not immune to pertussis, even though their serum antibody level was low.

In some instances, the same children who did not produce enough agglutinins against pertussis to obtain good serum levels, had an adequate production of diphtheria and tetanus antitoxins. In others (see Table IX) it is clear that the subjects were poor immunizers against more than one antigen.

TABLE IX. PATIENTS WITH POOR RESPONSE TO IMMUNIZATION

	PRE-IMMUNIZATION TITERS			TITERS ONE MONTH POSTIMMUNIZATION			TITERS SIX MONTHS POSTIMMUNIZATION		
CASE*	AGGLUTININS FOR PERTUSSIS	TETANUS ANTITOXIN (UNITS/C.C.)	DIPHTHERIA ANTITOXIN (UNITS/C.C.)	AGGLUTININS FOR PERTUSSIS	TETANUS ANTITOXIN (UNITS/C.C.)	DIPHTHERIA ANTITOXIN (UNITS/C.C.)	AGGLUTININS FOR PERTUSSIS	TETANUS ANTITOXIN (UNITS/C.C.)	DIPHTHERIA ANTITOXIN (UNITS/C.C.)
A75		Not done		1:800	>1.0	1.0	1:200	>0.3 <1.0	<0.03
A90	1:0	<0.1	<0.03	1:0	>1.0	>0.1 <1.0	1:0	>1.0	<0.03
A106	1:0	<0.1	<0.03	1:400	>1.0	>0.1 <1.0	1:0	0.3	<0.03
A108	1:50	<0.1	<0.03	1:3200	>1.0	1.0	1:50	>1.0	<0.03
B98	1:0	<0.1	<0.03	1:0	>1.0	>1.0	1:0	>1.0	0.1

*A, patients in "A" series (plain DPT vaccine).
B, patients in "B" series (alhydrox).

Fluctuation of the agglutinin titers was noted in some cases but, as shown in Tables III and IV, it was not such as to interfere with the interpretation of the results.

4. *Relationship of Systemic Reactions to Agglutinin and Antitoxin Titers.*—Sako[12] states "as a general rule, the more severe the reaction, the higher the titer of agglutinins for H. pertussis." An analysis of the cases in our series that had a moderate or severe systemic reaction (fever of 102° F. or more) fails to corroborate this statement. The agglutinin and antitoxin titers after immunization in these children were not significantly different from those in subjects without systemic reactions.

The number of severe local reactions was too small to permit us to draw any conclusion in this respect.

TREATMENT OF DIABETIC ACIDOSIS

ALEXIS F. HARTMANN, M.D., AND JANE ERGANIAN, M.D.
ST. LOUIS, MO.

RECOGNITION and treatment of serious disturbances of acid-base balance in infants and children continue to constitute an important part of hospital pediatric practice. During the 24-year period (1923 to 1946) in which one of us (A. F. H.) was particularly interested in the problem as it presented itself at the St. Louis Children's Hospital, there were encountered 1,465 instances of *metabolic acidosis* which were diagnosed by chemical determination of blood $BHCO_3$. Unquestionably, many cases were missed, particularly those of mild degree in moribund children. Relative to the total number of admissions, the incidence of metabolic acidosis is approximately 2 per cent. The potential seriousness of the condition and the technical aspects of therapy, however, lend much more importance to it.

A rough breakdown of these children is shown in Table I. It will be seen immediately that severe gastrointestinal disturbance referred to as *diarrhea* accounts for approximately three-sevenths or 44.7 per cent of the total number and that *diabetes mellitus, renal disease, severe infection,* and *other causes* each account for approximately one-seventh.

TABLE I. INCIDENCE OF METABOLIC ACIDOSIS, 1923-1946 INCLUSIVE

	1923-33	1934-46	TOTAL	PER CENT
1. Diarrhea	178	477	655	44.7
2. Diabetes mellitus	78	131	209	14.2
3. Renal disease	78	130	208	14.2
4. Infection or moribund state	44	142	186	12.6
5. Other causes	71	136	207	14.2
		Total cases	1,465	99.9

During the first few years of the study, therapy excluded any *alkali administration per se* except for a few cases of diabetic acidosis,[1] and relied chiefly on administration of *dextrose* and *NaCl* and the antiketogenic effects of *insulin*. During this era, the most prominent champions of this method of therapy which excluded alkali administration were Gamble[2] and his co-workers in Boston and Hoag[3, 4] and his co-workers in New York in the field of *pediatrics*, and Joslin[5, 6] and his school and Peters[7] and his co-workers in Boston in the field of *internal medicine*.

Due chiefly to the influence of Marriott, one of us (A. F. H.) undertook a restudy of the possibilities of *direct* alkali administration and soon became enthusiastic about the results obtained by the early administration of $NaHCO_3$ along with all other indicated treatment.[8, 9] Shortly afterward, Na-lactate was substituted for $NaHCO_3$[10-14] because lactate possessed several important advantages over bicarbonate. There was also substituted a *hypotonic Ringer's*

From the Department of Pediatrics, Washington University School of Medicine, and the St. Louis Children's Hospital.
Read before the Section of the New York Academy of Medicine, Feb. 13, 1947.

6. Miller, J. J., and Silverberg, R. J.: Agglutinative Reaction in Relation to Pertussis and to Prophylactic Vaccination Against Pertussis with Description of a New Technic, J. Immunol. 37: 207, 1939.
7. Flosdorf, E. W., McGuinness, A. C., Kimball, A. C., and Armstrong, J. G.: Studies with *H. Pertussis;* preparation and assay of hyperimmune human serum, J. PEDIAT. 19: 638, 1941.
8. Miller, J. J., Jr., Silverberg, R. J., Saito T. M., and Humber, J. B.: An Agglutinative Reaction for Hemophilus pertussis; II. Its Relation to Clinical Immunity, J. PEDIAT. 22: 644, 1943.
9. Sako, W.: Studies on Pertussis Immunization, J. PEDIAT. 30: 29, 1947.
10. Ratner, B.: Allergy, Anaphylaxis and Immunotherapy, Baltimore, 1943, Williams and Wilkins Company, pp. 168-188.
11. Edsall, G.: Active Immunization, New Eng. J. Med. 235: 256, 1946.
12. Sauer, L. W., Tucher, W. H., and Markley, E.: Immunity Responses to Mixtures of Diphtheria Toxoid and Pertussis Vaccine, J. A. M. A. 125: 949, 1944.
13. Sako, W., Treuting W. L., Witt, D. B., and Nichamin, S. J.: Early Immunization Against Pertussis with Alum Precipitated Vaccine, J. A. M. A. 127: 379, 1945.
14. Waddell, W. W., Jr., and L'Engle, C. S., Jr.: Immune Response to Early Administration of Pertussis Vaccine, J. PEDIAT. 29: 487, 1946.
15. Miller, J. J., Jr., and Saito, T. M.: Concurrent Immunization Against Tetanus, Diphtheria, and Pertussis; Comparison of Fluid and Alum-precipitated Toxoids, J. PEDIAT. 21: 31, 1942.
16. DeGara, P. F., and Mayer, S. A.: The Agglutinative Reaction for Hemophilus pertussis Following Whooping Cough and Following Immunization, J. PEDIAT. 30: 171, 1947.
17. Adams, J. M., and Kimball, A. C.: To be published in J. PEDIAT.
18. di Sant'Agnese, P. A.: To be published.

During the past year, however, Darrow has most definitely demonstrated K loss, particularly as a result of diarrhea, and reopened the advisability of early direct replacement of potassium.[21] It seems, therefore, very desirable to us at this time to analyze carefully results which have been obtained without a K-fortified solution, so that later when sufficient experience with special potassium therapy has been obtained, comparison of the two methods will be possible.

In this analysis we wish particularly to stress ketone-body acidosis and especially that of diabetes mellitus, reserving for later consideration that type of acidosis based on diarrhea or renal failure in which alkali therapy is even more imperative. We shall stress pathways of recovery as related particularly to *dosage* of *administered alkali* and *time* required for complete or almost complete recovery.

DOSAGE OF ALKALI

Let us first look into the matter of dosage of alkali as recommended by various pediatric authorities for the correction of acidosis in general where attempts have been made to apply formulae.

Hartmann-Senn.—(J. Clin. Investigation, p. 334, March, 1932.)

"60 – CO_2 cont. × .3 body weight (Kg.) = c.c. molar Na-lactate or $NaHCO_3$"

or

$BHCO_3$ deficit in mM/L. × .67 body weight (Kg.) = c.c. molar Na-lactate

Example for severe acidosis of 20 mM $BHCO_3$ deficit (24 – 4) × .67 = 13.4 mM Na-lactate *per Kg.*

Later, however, Hartmann, Perley and associates (J. PEDIAT. **13**: Nov., 1938), and Hartmann and associates, in many subsequent statements, advised administering first 60 c.c. ⅙ molar per kilogram and later an additional dose of 30 c.c. ⅙ molar per kilogram or more if it seemed advisable. This, of course, would amount to an initial dose of 10 mM per kilogram with a second of 5 or more.

Mitchell-Nelson.—Textbook of Pediatrics, ed. 4, p. 169, 1945.

Apparently assume an equally sharing body water content of 0.7 body weight, and state

"CO_2 deficit in m.eq./L. × body weight in kilogram × 0.059 = Gm. $NaHCO_3$."

This formula could be rewritten as follows:

$BHCO_3$ deficit mM/L. × 0.7 body weight (Kg.) = mM $NaHCO_3$ or Na-lactate. Example (24 – 4) × 0.7 = 14 c.c. mM Na-lactate per kilogram.

On the same page, however, a statement directly referring to Na-lactate appears which is incompatible with the above formula and is as follows:

"1 c.c. of ⅙ molar sodium lactate solution per kilogram body weight will increase the plasma bicarbonate 0.8 m.eq. per liter, or 1.8 volumes per cent of CO_2 per 100 c.c. of plasma."

Microscopic Examination.—

Heart.—In a preparation of the interventricular septum of the heart, there is a large area of infarction involving the entire thickness of the wall with necrosis of the cardiac muscle fibers, hemorrhage, edema, and infiltration of the affected area with polymorphonuclear leucocytes. Within and about the infarcted area several branches of the coronary artery show pronounced thickening and fragmentation of the media with resultant narrowing of the lumina. The intima is uninvolved. In an elastic Van Giesen stained preparation, the internal elastic membrane is intact. The medial thickening is due to replacement of the smooth muscle by fibrous tissue. The external elastic membrane is fragmented and the media and adventitia are infiltrated with polymorphonuclear leucocytes, lymphocytes, and plasma cells. The lumina of many of the arteries and veins are occluded by pink-staining thrombotic material.

In sections taken from other areas of the heart many of the myocardial fibers are vacuolated, but Scharlach R and Best's carmine stains fail to reveal either fat or glycogen. The vessels in these regions show medial changes similar to, but less extensive than those in the region of the infarct. Collections of plasma cells surround some of these blood vessels. A few small arterioles are thrombosed and are surrounded by necrotic myocardial fibers. The epicardium is infiltrated with collections of plasma cells and lymphocytes.

Lungs.—Widespread areas of atelectasis with congestion of the vessels are present within the lungs. Many of the alveoli and smaller bronchioles contain large amounts of debris and blood pigment while others are filled with aspirated material. The small arteries and arterioles of the lung show fibrous thickening and fragmentation of the media. The lumina here are not narrowed. The media and adventitia are infiltrated with a few lymphocytes and plasma cells. Large collections of these cells as well as a few polymorphonuclears leucocytes are seen in many of the septal regions throughout both lungs.

Liver.—The liver sinusoids are markedly congested and the liver cell cords compressed. The liver cells are vacuolated and contain golden brown pigment granules. The Kupffer cells are prominent. Hematopoietic foci are extremely numerous.

Pancreas.—In preparations from the pancreas the lobular pattern is accentuated. The cytoarchitecture of the acini is distorted by an extensive fibrotic process which has replaced a large proportion of the parenchyma. The fibrous tissue is densely infiltrated with numerous round cells. The remaining acinar and duct structures appear relatively normal. Islands of Langerhans are present in usual numbers but appear somewhat loosely constructed. The blood vessels are not unusual.

Adrenals.—The adrenal glands show several small cortical adenomata but are otherwise not remarkable.

Kidneys.—In preparations from the kidneys, the cortex and medulla are well demarcated. The glomerular capillaries are congested. The epithelial cells lining the convoluted tubules contain golden brown pigment granules. Many of the collecting tubules contain casts of pink-staining debris, occasional red blood cells and their epithelial lining cells are poorly preserved. The blood vessels of the kidneys are somewhat distended, but are otherwise not remarkable.

Spleen.—The sinusoids of the spleen are congested. The Malpighian corpuscles are large but no germinal centers are seen. Foci of hematopoiesis are scattered throughout the splenic pulp. The blood vessels of the spleen are not remarkable.

Bone.—The metaphysis of a rib taken for section is thin and straight. The periosteum is intact and the trabeculae are not remarkable.

Bone Marrow.—The bone marrow shows moderate hyperplasia of the erythrogenic and myeloid elements.

Anatomic Diagnosis.—Sclerosis, medial, of coronary arteries; thrombi in coronary arteries; myomalacia cordis; hypertrophy and dilatation of heart; pancreatitis, chronic; extramedullary hematopoiesis in liver and spleen; atelectasis and hemorrhage in lungs; congestion of viscera.

per liter of blood would have to be added to secure an increase of 18 mM. Therefore, to secure an increase of 20 mM $BHCO_3$ per liter of blood, a total of 31 mM would have to be given, or an additional 55 per cent.

2. If, during the period of recovery from acidemia, hemoglobin becomes more fully oxygenated, which seems usually to occur, still more base would be claimed than the pH shift alone would necessitate.

3. Fixed tissue buffers would be expected to behave in a similar fashion.

4. If recovery is attended by permanent gain in body fluid content, which usually occurs to the extent of 5 to 10 per cent of the original body weight, or 7.5 to 15 per cent of the original body fluid, there would be a corresponding decrease of $BHCO_3$ concentration.

5. There may exist a continued trend toward development of acidosis, such as continued loss of alkali as the result of continued severe diarrhea, continued excessive secretion of alkaline urine, or continued abnormal acid formation, such as in the ketosis of salicylate intoxication, milkweed poisoning, or in diabetes mellitus when insulin effect is inadequate. In this category also might be included occasionally increased lactic acid formation as a result of convulsions, unusual activity, and tissue anoxia.

6. Some loss of Na-lactate by excretion into the urine may occur. When diuresis is not immediate, and, therefore, in almost all cases of dehydration except those due purely to primary polyuria, such loss might be expected to be less than 10 per cent.

7. There might possibly exist interference with the utilization of lactate such as might result from continued tissue anoxia or severe liver damage. Such interference would be expected to lead to persistent high blood concentrations of lactate and possibly more than usual excretion into the urine. Extensive observation over many years has proved that such interference does not occur except in subjects actually dying. Delay of a few hours in the complete utilization of Na-lactate is, however, occasionally noted in apparently moribund subjects who eventually recover.

Let us now enumerate factors which would tend to supplement and enhance the effect of conversion of Na-lactate into $NaHCO_3$ in the tissue fluids, or increase the effect of administered $NaHCO_3$.

1. Pre-existing lactate accumulation, which disappears simultaneously with the metabolism of injected lactate, as a result of improvement of circulation, recovery from tissue anoxia, or reduction in lactic acid formation. Such a factor as this is especially significant in subjects in a postconvulsive state, or in subjects in whom extreme anhydremia has been relieved during the time period under consideration.

2. Simultaneous abolition of ketosis, such as occurs in the diabetic receiving insulin, in properly treated salicylate intoxication, milkweed poisoning, starvation, and certain infections. The significance of this factor depends both on the original extent of ketone acid accumulation and on their rate of oxidative removal in the tissues.

3. Renal activity which results in quantitatively significant tubular reabsorption of fixed base and rejection of fixed or organic acid from glomerular filtrate.

Post-mortem Examination.—Post-mortem examination performed four hours after death revealed gross significant findings only in the thoracic organs. The heart weighed 18 Gm. The posterior wall of the left ventricle was hemorrhagic over an area measuring 2.3 × 1.5 cm. The center of this area was yellow in color and the myocardium was softer than elsewhere. The hemorrhagic infarct involved the entire thickness of the wall as well as the posterior papillary muscle of the mitral valve. The heart was not dilated and the right ventricle measured 0.3 cm. and the left 0.5 cm. in thickness. The coronary ostia were patent. The coronary vessels followed the usual course and were patent as far as they could be traced. A vein in the region of the infarct contained a large thrombus. The lungs were congested and atelectatic. There was a small amount of hemorrhagic fluid in the subarachnoid space. The other organs showed nothing of note.

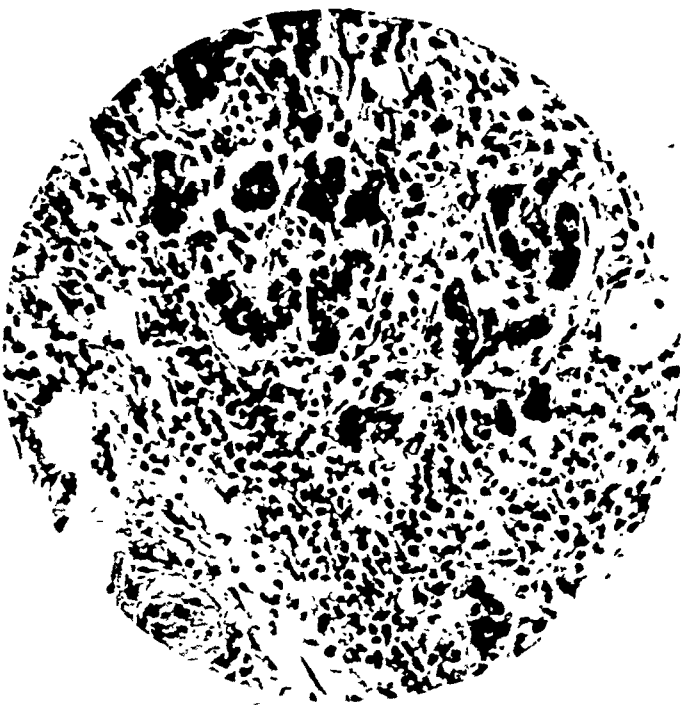


FIG. 2.—(Case 1.) Section of pancreas showing marked fibrosis and cellular infiltration. H and E ×200.

Microscopic Examination.—

Heart.—In sections of the posterior wall of the left ventricle almost the entire thickness is necrotic. The myocardium is hemorrhagic and individual muscle fibers either cannot be seen or are ghostlike in character. Replacing the usual structures is an homogeneous pink-staining material, fibrin, and large pools of blood. Scattered throughout are numerous poorly preserved nuclei, many of which are pyknotic or karyorrhectic. Many blood vessels can be identified whose lumina are completely occluded by thrombotic material and whose walls merge with the surrounding necrotic tissue. At the periphery of the infarcted area numerous distended capillaries are seen. In addition there are collections of polymorphonuclear leucocytes as well as occasional round cells. These collections of cells are especially prominent beneath the endocardium. A few spindle-shaped fibroblastic cells are also seen extending into the infarct. Elsewhere the myocardium is fairly well preserved. The fibers are slender and nuclei stain well. Cross striations are indistinct. The sarcoplasm contains occasional small vacuoles. The interstitial connective tissue is delicate and harbors distended blood vessels whose

TABLE IV. RECOVERY FROM DIABETIC ACIDOSIS

NO.	HISTORY NO.	DATE	AGE	pH	HCO_3 mM/L.	CL M.EQ./L.	PROTEIN GM./100 C.C.	H_2O GM./100 C.C.	FREEZING POINT M.OSM./L.	GLUCOSE MG./100 C.C.	N.P.N. MG./100 C.C.	TOTAL BASE M.EQ./L.	TREATMENT INTERVAL (HR.)
1	A-599	2/11/25	12	6.97	4.7	98.8	--	--	--	475	30.8	--	12
		2/12/25		7.30	13.4	--	--	--	--	175	38.0	--	
2	A-365	6/ 3/26	10	7.17	6.2	92.0	9.99	--	--	516	52.2	128	22
		6/ 4/26		--	19.1	95.0	8.81	--	--	112	46.8	138	
3	C-1636	8/24/26	12	7.10	6.4	--	--	--	--	470	--	--	15
		8/24/26		7.38	21.5	--	--	--	--	226	--	--	
4	A-1394	9/16/26	8	7.00	4.7	84.8	9.99	--	351	488	37.8	119	20
		9/17/26		7.23	14.3	90.0	8.49	--	284	91	41.8	123	
5	B-1826	4/ 4/27	7	7.25	10.0	96.0	8.28	--	--	210	26.0	--	24
		4/ 5/27		--	20.6	98.0	8.28	--	--	86	--	--	
6	C-1650	5/26/28	15	7.10	10.0	92.8	8.23	91.1	346	492	36 6	150	23
		5/27/28		7.35	15.6	98.5	8.31	92.4	282	148	27.7	152	
7	A-1739	1/31/27	12	7.10	6.4	96.0	9.56	--	413	413	33.0	133	26
		2/ 1/27		--	14.5	--	7.20	--	--	76	--	--	
8	A-1394	4/ 3/28	9	7.00	8.0	89.1	7.88	88.6	394	707	48.0	141	21
		4/ 4/28		7.57	39.3	84.8	5.90	94.2	452	40	46.4	154	
9	A-1394	6/ 6/28	9	6.95	2 9	80.8	6.80	88 5	--	922	--	127	8
		6/ 7/28		7.43	22.8	90.0	7.18	92.5	--	22	--	143	

anomalies, secondary thrombosis and myomalacia are highly unusual, even in those patients who survive the periods of infancy and childhood. A recent example is that of Knop and Bennet[10] who described sudden death in a 5-day-old female infant who had a single coronary artery with a hypoplastic left branch. Frank myomalacia cordis was not present, although vacuolar degeneration of the myocardium was noted.

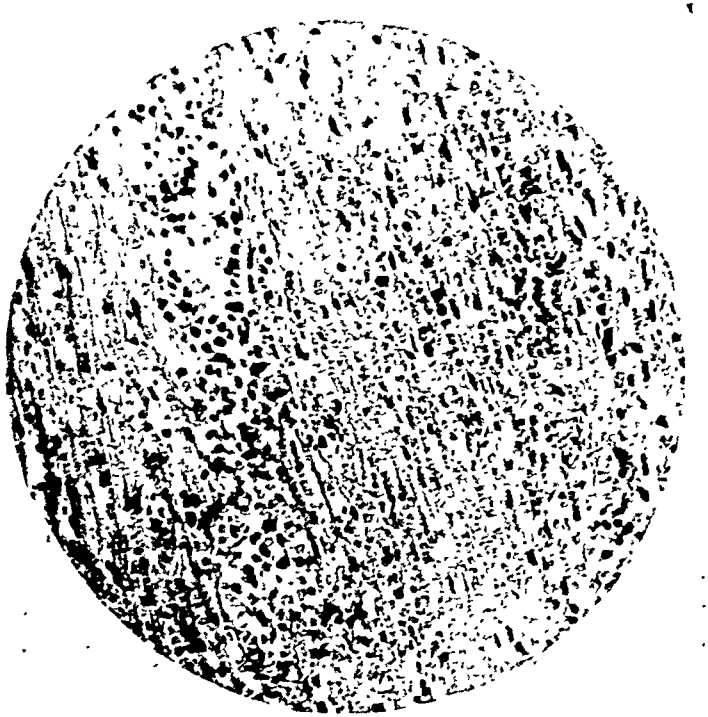


Fig. 4.—(Case 2.) Section from ventricle with hemorrhage, destruction of myocardial cells, and cellular infiltration. H and E ×200.

Brown and Richter[11] found six published cases of "medial coronary sclerosis" occurring in infancy, to which they added one of their own. These cases showed calcification of the internal elastic membrane of all the arteries of the body, accompanied by intimal proliferation resulting at times in coronary occlusion and myocardial ischemia with areas suggestive of infarction. These foci of necrosis could not be distinguished from areas of myocardial necrosis such as those seen in rats poisoned by irradiated ergosterol. Some alteration in the calcium-phosphorous metabolism of the body was postulated in these cases. A similar condition has been produced in experimental animals by administering large doses of parathormone[12] or Vitamin D.[13]

The two cases presented here are unique. So far as is known they are the first descriptions of myocardial infarction in the newborn infant. Thus they complete the picture and indicate that myomalacia cordis may occur at any age of life.

these who need treatment most promptly and who require the most alkali for complete correction.) *Average* respiratory adjustment to severe acidosis is well under 50 per cent complete.

All subjects with severe diabetic acidosis are dehydrated and permanent retention of fluid after recovery usually is at least 5 and may sometimes be 10 per cent of the initial body weight. In some, moreover, dehydration of the blood, or anhydremia or hemoconcentration as it is more frequently called, is so severe that the subject appears in shock and is in circulatory failure. All subjects have a chloride deficit as well as a bicarbonate deficit, apparently chiefly the result of vomiting, which almost always attends the development of acidosis. Due to the initial hemoconcentration, however, the extent of such chloride deficit is not revealed by the original plasma value. All have ketosis, but the degree to which ketosis accounts for $BHCO_3$ deficit is very variable. In many instances when ketosis has been completely relieved, there is still significant $BHCO_3$ and total fixed base deficit. It is our clinical impression that well-nourished children who develop acidosis quickly and whose acidosis has been of short duration show relatively the most intense ketosis and are best adjusted to $BHCO_3$ deficit, whereas the poorly-nourished child in acidosis longer will show relatively less ketosis, more fixed base deficit, and will have the lower pH_s values. The glycogen reserves are apparently low in all subjects and in all there are also both hyperglycemia and glycosuria. In the following lantern slides are data referable to some of these points which describe initial conditions found in the twenty-four children in whom plasma pH determinations were made (Tables IV and V), as well as conditions some time later.

With the above characteristics of severe diabetic acidosis in mind, we can now logically list the main objectives in treatment, and in the order of their

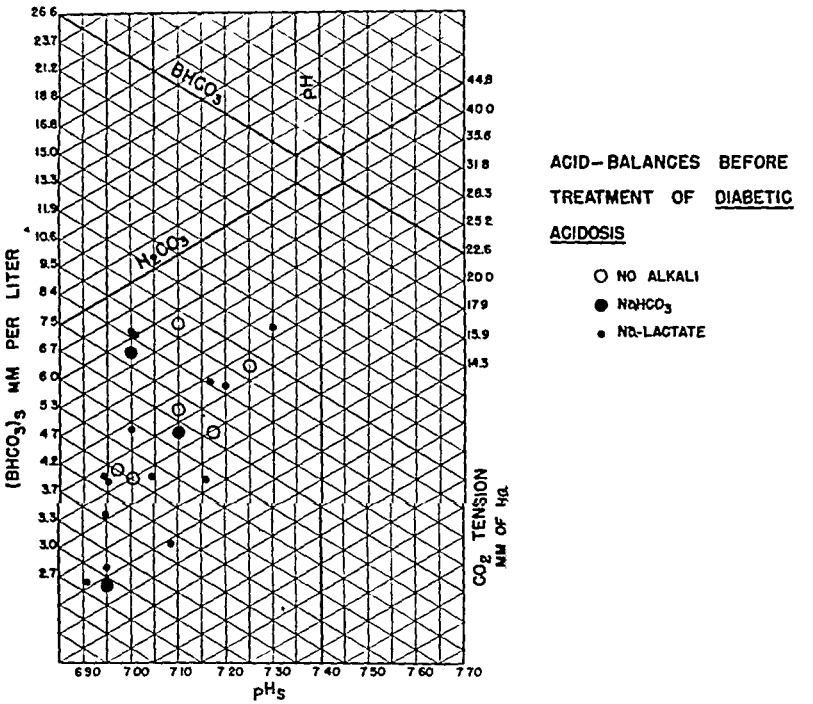
TABLE VI. OBJECTIVES AND THE MEANS BY WHICH THEY MAY BE ACCOMPLISHED IN THE TREATMENT OF SEVERE DIABETIC ACIDOSIS
(LISTED IN THE ORDER OF THEIR IMPORTANCE)

OBJECTIVES	MEANS
1. Restoration of body fluid pH and $BHCO_3$ (rapidly, completely, and safely)	By indirect effect of metabolism of Na $L^{(+)}$-lactate By indirect effect of metabolism of Na $D^{(-)}$-lactate By indirect effect of abolition of ketosis (insulin) By indirect effect of renal activity (Ringer's sol.)
2. Relief of anhydremia and dehydration (rapidly but safely)	By isotonic Na-lactate solution By hypotonic Ringer's solution By plasma protein
3. Restoration of normal total electrolyte pattern of body fluids	By Ringer's solution By Na-lactate solution By renal activity By abolition of ketosis, polyuria, vomiting
4. Abolition of ketosis	By insulin
5. Restoration of glycogen reserves	By insulin By effect of Na $L^{(+)}$-lactate
6. Reduction of hyperglycemia and glycosuria	By insulin
Average requirements	Insulin—2 units/Kg. body wt. ⅙ M. Na-lactate sol.—60-90 c.c. per Kg. body wt. Ringer's solution—40 ± c.c. per Kg. body wt.

REFERENCES

1. Ramsey, R. E., and Crumrine, R. M.: Coronary Thrombosis in an Infant Aged Four Months, Am. J. Dis. Child. 42: 107, 1931.
2. Ellis, R. W. B.: Infarcts and Aneurysm of Heart in an Infant of Nine Months, Proc. Roy. Soc. Med. 28: 1333, 1935.
3. Hughes, F. W. T., and Perry, C. B.: Senile Arterial Changes in a Child Aged Seven Weeks, Bristol Med. Chir. J. 46: 219, 1929.
4. Scott, E. P., and Miller, A. J.: Coronary Thrombosis. Report of a Case in an Infant Eleven Months of Age, J. PEDIAT. 28: 478, 1946.
5. White, P. D., and Mudd, S. G.: Angina Pectoris in Young People, Am. Heart J. 3: 1, 1927.
6. Reitman, N., Greenwood, W. R., and Kler, J. H.: Coronary Thrombosis in a Young Diabetic, Am. J. M. Sc. 203: 792, 1942.
7. French, A. J., and Dock, W.: Fatal Coronary Arterio-sclerosis in Young Soldiers, J. A. M. A. 124: 1233, 1944.
8. Zacks, L.: Coronary Thrombosis and Myocardial Infarction in Youth, Am. Heart J. 26: 269, 1943.
9. Guild, H. G., Kindale, F. B., and Gibson, T. A.: Arteriosclerosis in Childhood, Johns Hopkins Hosp. 62: 159, 1938.
10. Knop, C. Q., and Bennet, W. A.: Sudden Death from Coronary Insufficiency: Report of Case of an Infant. Proc. Staff Meet., Mayo Clinic 19: 574, 1944.
11. Brown, C. E., and Richter, I. M.: Medial Coronary Sclerosis in Infancy Arch. Path. 31: 449, 1941.
12. Hueper, W. C.: Metastatic Calcification in the Organs of the Dog After Injections of Parathyroid Extract. Arch. Path. 3: 14, 1927.
13. Shohl, A. T., Goldblatt, H., and Brown, H. B.: The Pathological Effects on Rats of Excess Irradiated Ergosterol, J. Clin. Investigation 8: 505, 1931.
14. Goodman, L., and Gillman, A.: The Pharmacological Basis of Therapeutics. N. Y., 1941, The Macmillan Company.
15. Davis, D., and Blumgart, H. L.: Cardiac Hypertrophy: Its Relation to Coronary Arteriosclerosis and Congestive Heart Failure, Ann. Int. Med. 11: 1024, 1937.

Fig. 2.


ACID–BALANCES BEFORE TREATMENT OF DIABETIC ACIDOSIS
NO ALKALI
NaHCO3
Na-LACTATE
(BHCO3)s MM PER LITER
BHCO3
pH
H2CO3
CO2 TENSION MM OF Hg
pHs
26.6
23.7
21.2
18.8
16.8
15.0
13.3
11.9
10.6
9.5
8.4
7.5
6.7
6.0
5.3
4.7
4.2
3.7
3.3
3.0
2.7
44.8
40.0
35.6
31.8
28.3
25.2
22.6
20.0
17.9
15.9
14.3
6.90
7.00
7.10
7.20
7.30
7.40
7.50
7.60
7.70

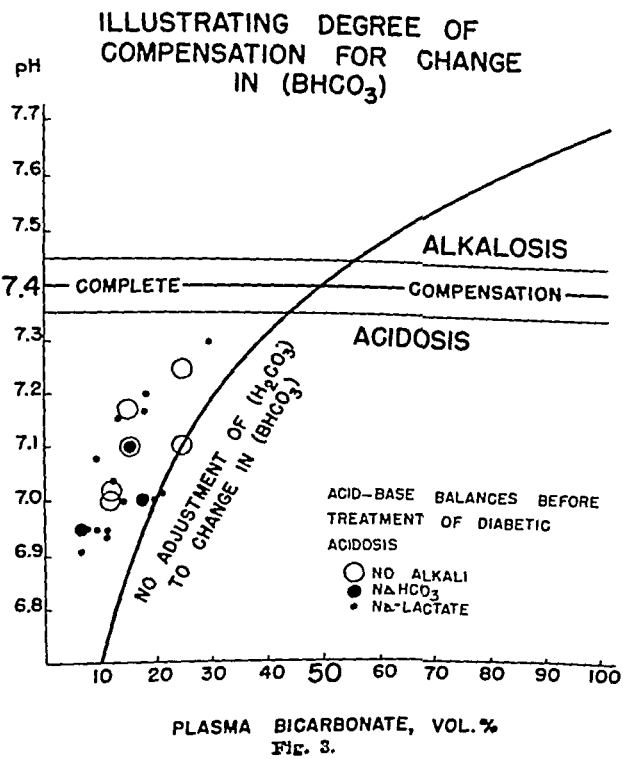
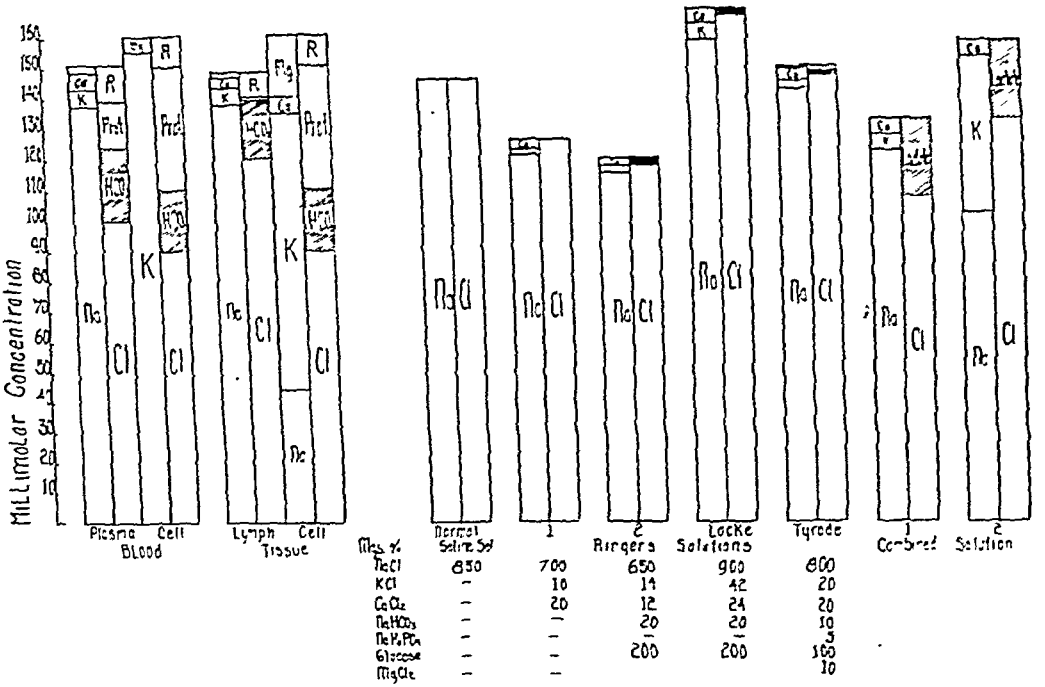

ILLUSTRATING DEGREE OF COMPENSATION FOR CHANGE IN (BHCO3)
pH
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7.0
6.9
6.8
ALKALOSIS
COMPLETE
COMPENSATION
ACIDOSIS
NO ADJUSTMENT OF (H2CO3) TO CHANGE IN (BHCO3)
ACID–BASE BALANCES BEFORE TREATMENT OF DIABETIC ACIDOSIS
NO ALKALI
NaHCO3
Na-LACTATE
10
20
30
40
50
60
70
80
90
100
PLASMA BICARBONATE, VOL.%

Fig. 3.

solution for isotonic NaCl for two reasons: (1) to secure additional water administration with reference to salt and in that way to help overcome dehydration and promote diuresis, (2) to supply K, Ca, and Mg, as well as Na. Our initial concept was to offer the body an excess of water, Na, K, Ca, Mg, Cl, and even potential HCO_3 in the form of excess of fixed base over fixed acid, so that by selective reabsorption the renal tubules could retain what was desirable and reject what was not, in the reconstitution of extracellular fluid.



Composition of Normal Body Fluids and Physiological Saline Solutions

Fig. 1.

Shortly after developing lactate-Ringer's solution for repair of extracellular fluid, one of us (A. F. H.) became concerned with *intracellular* fluid composition and attempted to make up for K deficiency by administering combined solution No. 2 (Fig. 1) parenterally after combined solution No. 1 (lactate-Ringer's solution) had been given for a while. After reporting on these studies to the American Pediatric Society at its St. Louis meeting in 1929, this attempt was abandoned both because no special improvement was noted and because sometimes the richer potassium solution seemed toxic. In its place were gradually substituted more vigorous attempts to aid the cells by more *complete parenteral feeding* in the form of whole blood, plasma, "enriched" plasma to provide essential fatty acids, vitamins, as well as glucose and minerals.[15-17] During this period of study, which takes us up to the present time, other workers, including Butler,[18] Levine,[19] and Dodd[20] were pursuing almost identical objectives.

secured by renal excretion of free acid or fixed acid bound to the NH_4 ion, (4) because of restrictions imposed both by time and physical condition, negligible amounts of potential alkali were ingested orally as fruit juices.

One of the three children receiving *$NaHCO_3$* is in normal position (No. 9) eight hours after start of treatment. One (No. 8) is still in poor position after four hours. This patient started with pH_s of 7.00 and ($BHCO_3$) of 10 mM per liter, received the usual amounts of insulin, salt solution, and dextrose and in addition 12 mM/Kg. $NaHCO_3$. Why did he do so poorly? His story is that for almost seven hours after beginning of treatment he remained in circulatory failure, being cyanotic, and with poor pulse. His breathing, while rapid, was not deep. His precarious position was also demonstrated by the remainder of the chemical analysis of his blood taken four hours after the start of treatment, which revealed the fact that the initial lactic acid content of the plasma of 3.7 had increased to *16.2* m.eq. per liter. During the seven- to twenty-one-hour period, improvement was marked, and at the later hour the plasma lactic acid had dropped to 2.5 m.eq. per liter. In the remaining patient receiving $NaHCO_3$ (No. 7) we had no data near the six-hour stage.

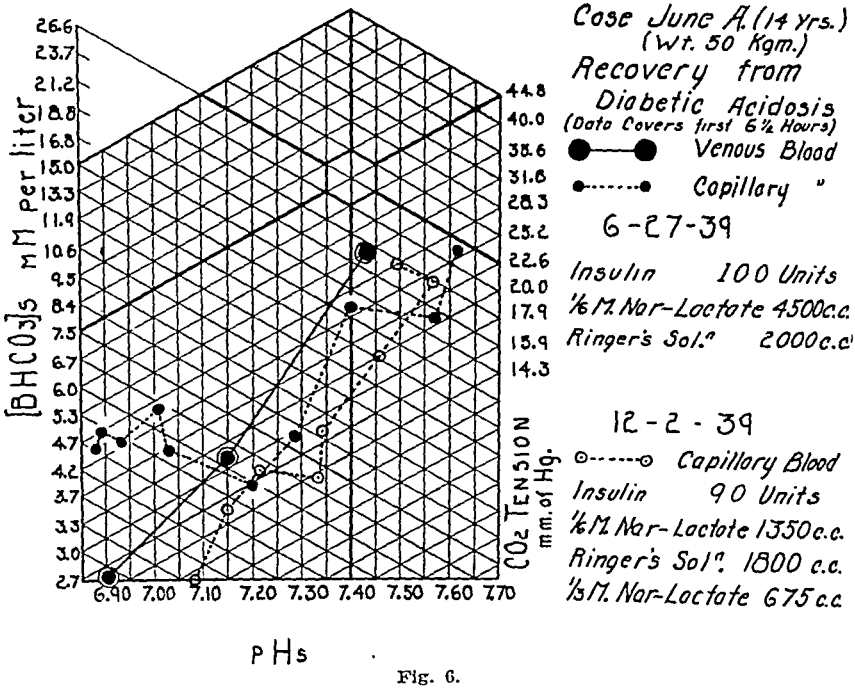


Fig. 6.

Of the twelve Na-lactate-treated patients with data at this time, all but two have made complete or almost complete recovery of pH_s, four somewhat overshooting the mark without, however, showing excessive $BHCO_3$ recovery.

Now let us inquire still more closely into the situation by following some of these patients individually at shorter intervals and for a little longer time. Let us begin with a 14-year-old girl who appears both as Case No. 17 and

With the use of the Mitchell-Nelson formula, only 30 per cent of such increase should be expected, since:

1 c.c. ⅙ molar Na-lactate per kilogram = .167 m.eq. HCO_3

per kilogram = $\frac{.167}{.7}$ m.eq./L. body water = .24 m.eq./L. = .54 vol. per cent CO_2 = 30 per cent of the stated rise.

Holt and McIntosh.—Holt's Diseases of Infancy and Childhood, ed. 11, p. 228.

"Wt. (lb.) × 55 − CO_2 (combining power) = cubic centimeters ⅙ M. Na-lactate of $NaHCO_3$."

Example, 2.2 × 44.8 = 98.8 c.c. ⅙ molar or approximately 15 mM per kilogram.

Darrow.—New England J. Med. (July), 1945.

"0.5 body wt. × $BHCO_3$ deficit in mM/L. = mM $NaHCO_3$ or Na-lactate."

Example, 0.5 × (24 − 4) = mM per kilogram.

or

60 c.c. ⅙ molar $NaHCO_3$ or Na-lactate per kilogram.

A summary of the above recommended dosages of alkali is given in Table II. While all these formulae are in essential agreement, they are all more or less empirically derived or assume distribution of injected or converted alkali throughout the body fluids without dissipation or enhancement. But let us look into this matter more closely, for it is somewhat more complicated.

TABLE II. CALCULATION OF ALKALI DOSAGE

AUTHOR	FORMULA	mM PER KG. BODY WT.
Darrow New Eng. J. Med., July, 1945	0.5 body wt. (Kg.) × $BHCO_3$ deficit mM/L. = mM $NaHCO_3$ or Na-lactate	10.0
Hartmann-Senn J. Clin. Invest., p. 334, Mar., 1932	60 − CO_2 cont. × .3 body wt. (Kg.) = c.c. molar Na-lactate or $NaHCO_3$	13.4
Mitchell-Nelson Textbook Pediatrics, 4th ed., p. 169, 1945	CO_2 deficit M.Eq./L. × body wt. (Kg.) × .059 = Gm. $NaHCO_3$	14.0
Holt and McIntosh Holt's Diseases of Infancy and Childhood, 11th ed., p. 228	Wt. (lb.) × (55 − CO_2 combining power) = c.c. ⅙ M. Na-lactate or $NaHCO_3$	15.0
Hartmann-Perley et al. J. PEDIAT., 13, Nov., 1938	60 c.c. ⅙ M. for initial dose 30 c.c. ⅙ M. or more later if needed	10-15 or > 15

Let us first enumerate factors which either always operate or sometimes operate during recovery from severe acidemia and which would prevent administered Na-lactate or $NaHCO_3$ from appearing quantitatively as $BHCO_3$ in body fluids in a reasonably short time (six to twelve hours).

1. All blood buffers other than H_2CO_3, but particularly hemoglobin, would claim more base with rising pH. For a pH shift of 7.4 to 7.0, while $BHCO_3$ undergoes a reduction of 18 mM per liter, other blood buffers yield 10 m.eq. per liter of alkali.[22] For a shift in the reverse direction, 28 mM of $BHCO_3$

TABLE XI. JUNE A. RECOVERY FROM DIABETIC ACIDOSIS

		CAPILLARY BLOOD					VENOUS BLOOD		
DATE	TIME	Vc%*	pH	CO_{2b}† mM/L.	CO_{2s}‡ mM/L.	CO_{2s} VOL.%	SERUM CO_2 VOL.%	SERUM pH	SERUM TRUE GLUCOSE MG./100 C.C.
12/2/39	9:40 A.M.						11.8 (5.3mM)	7.04	345.0
	9:55	51.0	7.08	2.8	3.4	7.5			
	(10:25 treatment started)	49.0	7.15	4.2	5.0	11.2			
	10:40	45.0	7.22	5.6	6.7	14.9			
	11:00	46.0	7.33	6.1	7.4	16.4			
	11:15	47.0	7.34	7.1	8.7	19.3			
	11:30	44.0	7.46	11.5	14.1	31.4			
	12:35 P.M.	42.5	7.57	13.9	17.3	38.6			
	2:30								44.6
	4:04	42.0	7.49	15.8	19.3	43.1			
	4:30						54.7		
	8:45								

*Vc = hematocrit.
†CO_{2b} = CO_2 content whole blood in mM/L.
‡CO_{2s} = CO_2 content serum in mM/L.

are recorded both pH_s and $(BHCO_3)_s$ on scales so adjusted that coinciding values represent little or no respiratory adjustment of H_2CO_3 for change in $BHCO_3$. Initially, pH_s was 6.91 with $(BHCO_3)_s$ 2.8 mM/L. when determined in venous blood, and pH_s 6.88 and $(BHCO_3)_s$ 4.8 mM/L. when determined by the Shock-Hastings microtechnique in capillary (arterial) blood. Subsequently, by this microtechnique, one of us (J. E.), with the assistance of Mary B. Ruhoff, followed the pathway of acid-base balance recovery in response to the treatment summarized on the chart, the details of which are given in Table VIII. If we examine the nature of recovery closely we will note that during the first two hours there was splendid rise in pH_s (from 6.88 to 7.20), while $(BHCO_3)_s$ was increasing only from 4.8 to 6.0 mM per liter. Such a change as this means that $(H_2CO_3)_s$ had to fall from an initial CO_2 tension of 27 to 16 mm. Hg. This then is what the initial increase in pulmonary ventilation in response to treatment accomplishes. But it also makes it necessary for buffers to bind more base, and in turn this is what largely prevents Na released early from the metabolism of lactate from appearing as $NaHCO_3$, and hence accounts for the early slow increase in $(BHCO_3)_s$. Recovery of $(BHCO_3)_s$ then began to accelerate and soon paralleled that of pH_s. At six hours $(BHCO_3)_s$ was at the average normal value of 24.5 mM/L. while pH_s had overshot to 7.62. As will be noted in subsequent data, such overshooting of pH_s recovery is characteristic of recovery from acidosis. Just as respiratory adjustment of H_2CO_3 falls behind while $BHCO_3$ *is diminishing, so also is there failure* to adjust immediately to late accelerated $BHCO_3$ recovery. It should be emphasized that no clinical manifestations of CO_2 deficit alkalosis are discernible at this point, although we have felt it wise always to have available 5 per cent CO_2 in oxygen if its administration seemed indicated. Concerning treatment, note

4. Extraneous alkali administration, such as frequently overlooked but often significant ingestion of fruit juices.

From even such a brief consideration as the above, it would seem improbable that any formula for calculation of an optimal dose of alkali for the relief of acidosis would work equally well for all cases. This would especially be true if variable pH change in particular were not included in the formula.

What would seem both possible and highly desirable would be the calculation of an initial dose of alkali which would be sufficient at least to relieve all dangerous degrees of acidosis, and yet preclude all risk of development of dangerous degrees of alkalosis, and at the same time accomplish such an end in just a few hours. Final complete correction could then be accomplished at a slower rate without risk of unnecessary continuation of the terrible load which the subject with a severe degree of acidosis is forced to bear.

We feel that the methods developed in the St. Louis Children's Hospital for the past fifteen years meet the above requirements and have proved highly satisfactory for correction of both acidosis and alkalosis, and we now wish to submit further evidence for such a claim. Rather than cover the whole subject of acid-base balance, we prefer to omit the types of acidosis (e.g., renal—diarrheal) in which there is more general agreement as to the need for alkali replacement, and instead shall concentrate on diabetic acidosis.

Let us first analyze findings characteristic of severe diabetic acidosis.

By definition, there is always extensive $BHCO_3$ deficit in the body fluids. For purposes of analysis we have classified severity of acidosis as follows (Table III): All subjects with severe diabetic acidosis should exhibit some degree of air hunger or hyperpnea, which would be an expression of respiratory defense in compensation for $BHCO_3$ reduction. The degree of hyperpnea is variable, however, and seems not very closely related to the $BHCO_3$ content. Indeed, often with the general improvement which follows shortly after beginning of treatment, hyperpnea becomes more evident for a while, rather than less. This point is especially evident in moving pictures which we have made perpnea one would, therefore, expect variation in initial pH of the plasma, and, indeed, such is the case. In subsequent discussion we have made use both of the Steinhaus-Hastings[23] and of the Gamble[24] type of chart to illus- at intervals during treatment. With variable degrees of compensatory hy- trate this point.

From these instructive data which will be discussed later it can be noted that in some individuals there is no adjustment whatsoever of H_2CO_3 to change in $BHCO_3$. (Parenthetically it may be stated that it is such individuals as

TABLE III. CLASSIFICATION OF SEVERITY OF ACIDOSIS

Extreme acidosis (CO_2 cont. 6-14.9 vol. %) ($BHCO_3$ 2.5-6.3 mM/L.)	Moderate acidosis (CO_2 cont. 25-34.9 vol. %) ($BHCO_3$ 10.7-14.8 mM/L.)
Severe acidosis (CO_2 cont. 15-24.9 vol. %) ($BHCO_3$ 6.4-10.6 mM/L.)	Mild acidosis (CO_2 cont. 35-44.9 vol. %) ($BHCO_3$ 14.9-19.1 mM/L.)

especially in this case that 15 mM Na-lactate per kilogram were required to effect accurate restoration of $(BHCO_3)_s$ in 6½ hours.

When seen a second time, five months later, on Dec. 2, 1939, this girl, while proving to be with even lower initial $(BHCO_3)_s$ (3.4 mM/L.), was much less prostrated and less dehydrated and hyperventilating more than on her previous admission. It was no surprise, therefore, to find her pH_s less reduced, 7.08 (Fig. 8). The pathway of recovery this time varied from the previous one in that both pH_s and $(BHCO_3)_s$ recovered at more rapid rates, but with $(BHCO_3)_s$ again lagging relative to pH_s. At four hours pH_s had overshot to its maximal value of 7.57 with $(BHCO_3)_s$ only 17.3 mM per liter. At six hours, pH_s had dropped to 7.49 while $(BHCO_3)_s$ had reached 19.3 mM per liter.

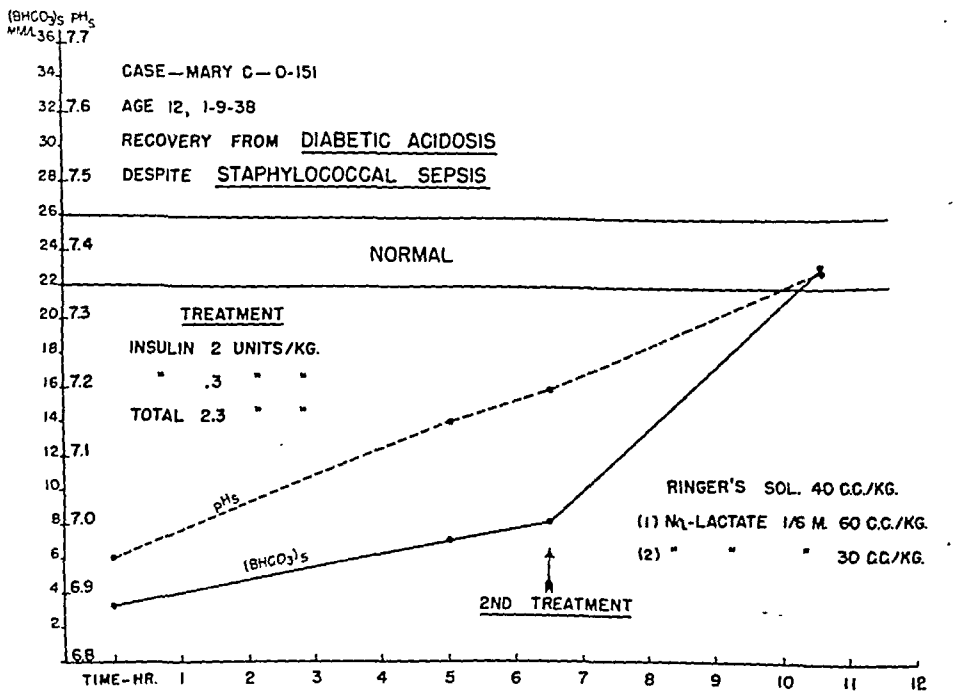


Fig. 9.

Note that in this instance only the initial 10 mM/Kg. of Na-lactate were administered, and while $(BHCO_3)_s$ recovery was not entirely complete in six hours, it was nearly enough so to remove the patient out of all danger and from strain of hyperpnea. Note also that because this patient was initially less dehydrated than usual for a commensurate degree of acidosis, we elected to cut down the total fluid intake by giving half of the Na-lactate in ⅓ molar concentration intravenously.

Case 16, a poorly nourished girl of 12 years, will next be considered (Fig. 9). Moving pictures of this girl will later be shown correlated with the blood chemical data. This subject resembled Case 17 very much on her first admission in that she was in deep coma, very feeble, and with very poor initial

TABLE V. RECOVERY FROM DIABETIC ACIDOSIS

NO.	HISTORY NO.	DATE	AGE	pH	HCO_3 MM/L.	Cl MEQ./L.	PROTEIN GM./100 C.C.	GLUCOSE MG./100 C.C.	N.P.N. MG./100 C.C.	TREATMENT INTERVAL (HR.)
10	L-129	2/29/32	9	7.00	5.8	91.8	7.60	543	33.0	20
		3/ 1/32		7.41	23.0	--	--	172	--	
11	L-1807	8/ 5/36	5	7.00	8.6	--	--	290	--	24
		8/ 6/36		--	29.7	--	--	80	--	
12	J-373	8/ 6/36	10	7.01	8.6	--	--	372	--	25
		8/ 7/36		--	23.2	--	--	77	18.0	
13	L-2531	9/ 5/37	8	--	3.8	--	--	344	--	17
		9/ 6/37		7.41	22.1	--	--	20	--	
14	L-1850	10/ 5/37	10	7.08	4.0	--	6.74	315	27.0	6
		10/ 5/37		7.38	17.1	--	--	61	--	
15	N-2070	11/11/37	12	7.30	12.4	--	7.41	355	27.0	12
		11/11/37		7.43	26.4	--	--	120	--	
16	Ó-151	1/ 9/38	12	6.95	3.1	94.0	7.46	459	41.0	21
		1/10/38		7.43	25.9	94.0	5.96	178	37.0	
17	K-372	6/27/39	14	6.91	2.8	--	--	448	--	28
		6/28/39		7.43	19.1	--	--	207	--	
18	K-372	12/ 2/39	14	7.04	5.0	--	--	345	--	11
		12/ 2/39		--	23.2	--	--	--	--	
19	P-1200	4/18/40	7	7.16	5.7	--	--	610	--	6
		4/18/40		7.53	26.6	--	--	235	--	
20	Q-1143	4/25/40	11	6.91	4.5	--	--	758	--	17
		4/26/40		--	29.2	--	--	59	--	
21	Q-1143	6/12/40	11	7.17	7.6	--	--	357	--	21
		6/13/40		--	--	--	--	106	--	
22	Q-1927	9/ 5/40	14	7.20	7.7	--	--	617	--	7
				--	23.8	--	--	--	--	
23	S-1520	3/23/45	13	6.95	4.4	103.0	8.11	405	30.5	24
		3/24/45		--	--	95.8	5.70	--	21.0	
24	T-1619	12/ 6/46	13	6.95	3.8	100.0	--	672	35.0	24
		12/ 7/46		7.47	28.7	--	--	158	--	

acid-base balance; pH_s 6.95 and $(BHCO_3)_s$ 3.1 mM per liter. In response to the first 10 mM/Kg. dose of Na-lactate, recovery of pH_s was not entirely satisfactory in five hours, from 6.95 to 7.15, and $(BHCO_3)_s$ rose only from 3.1 mM/L. to 7. When these facts were learned and coupled with her still unsatisfactory clinical condition a second dose of 5 mM/Kg. Na-lactate with more insulin was administered at the 6½-hour mark. $(BHCO_3)_s$ recovery then accelerated, and at the ten and one-half hour mark both pH_s and $(BHCO_3)_s$ were normal. The patient by this time had regained complete consciousness and so much strength that she was able to sit up unaided, this in spite of the unsuspected presence of what was the next day to prove to be fatal staphylococcus sepsis.

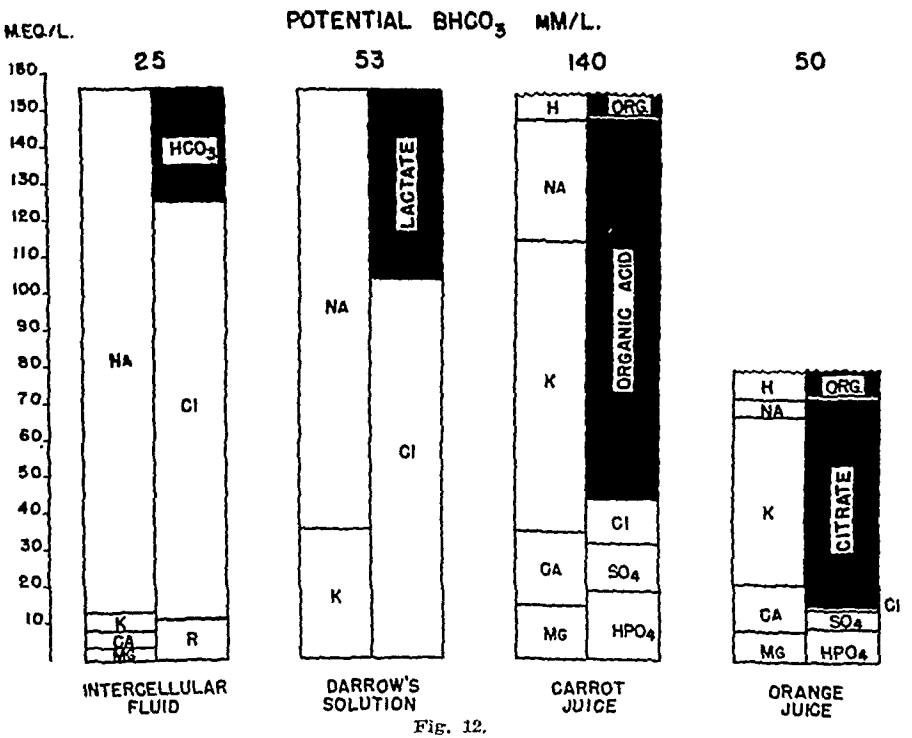


Fig. 12.

The next case (No. 24) a boy aged 13, was admitted Dec. 6, 1946, with quite low $(BHCO_3)_s$, 4 mM/L., and with very poor respiratory adjustment, pH_s of 6.95 (Fig. 10). In response to 10 mM/Kg. Na-lactate he showed in seven hours just what might have been predicted from the previous studies, namely, slight overshooting of pH_s with slight lag of $(BHCO_3)_s$.

In Case 13, a girl aged 8, we lacked an initial pH_s determination to go with the very low initial $(BHCO_3)_s$ of 3.8 mM per liter (Fig. 11). Six and one-half hours after administration of 10 mM/Kg. Na-lactate, pH_s was slightly subnormal, 7.33, while $(BHCO_3)_s$ was only 9.5 mM/L. By the twelve-hour mark, however, $(BHCO_3)_s$ had reached the normal value of 22.8 mM/L., because, undoubtedly, of synergistic and accumulative effects of renal activity, continued insulin

importance (Table VI). A better understanding of our treatment might be had if we compare it to the types of treatment in current use. (Table VII).

In this comparison it should be noted that we retain the insulin and water components, substitute hypotonic Ringer's solution for isotonic NaCl, and isotonic Na-lactate for $NaHCO_3$, and secure from lactate sufficient glucogenic effect to render early administration of dextrose unnecessary (60 c.c. ⅙ M. Na-lactate per kilogram possesses a glucose potential of 0.9 Gm. per kilogram).

TABLE VII. TREATMENTS PROPOSED FOR DIABETIC ACIDOSIS

JOSLIN ET AL.	PETERS ET AL.	HARTMANN ET AL.
Insulin q.s. ad. for speedy abolition of ketosis	+	+
Isotonic NaCl for dehydration	+	Hypotonic Ringer's
Oral water, fruit juices *for dehydration*	Not relied upon	Not relied upon
----------	$NaHCO_3$	Na-lactate
----------	Dextrose I.V.	----(Sufficient glucogenic effect from Na-lactate)

ANALYSIS OF RESULTS OF TREATMENT

Let us first consider the behavior of plasma pH and $BHCO_3$, because together they define the acid-base balance of the blood. We have twenty-four subjects in whom initial acid-base balances were determined. (Figs. 2 and 3.)

As mentioned before, it will be seen at a glance that respiration never fully compensates for $BHCO_3$ deficit, but that instead, acid-base balances sometimes indicate no adjustment whatsoever of H_2CO_3 to change in $BHCO_3$. It should also be noted that when $BHCO_3$ is reduced to the value of 4 to 5 mM per liter, the pH is rarely ever above 7.0.

A reasonable explanation for such relative respiratory failure is that the child is simply too weak to maintain normally maximal respiratory effort and normal pulmonary circulation. As will be noted in the movies, the first evidence of improvement after treatment begins is increase in both rate and depth of respiration, together with obvious general increase in strength.

Let us now examine the situation about six hours after treatment with the three different methods.

The six-hour period has been chosen because by this time (1) ketosis significant from the point of view of base-binding no longer exists, (2) all or nearly all of the originally administered fluid has been absorbed, (3) initially administered Na-lactate has been completely metabolized and (4) maximum effect has been obtained from the first dose of insulin. (Figs. 4 and 5.)

We now find that five of the six children receiving *no alkali* have still very poor positions of acid-base balance. In the sixth (No. 5) we had no data at this particular time.

Why have these children done so poorly? Because, we believe (1) their ketosis only partly accounted for their acidosis, (2) much of the fixed base released by oxidation of the ketone acids was claimed by buffer acids other than H_2CO_3, (3) sufficient time had not elapsed for much aid to have been

effect on ketosis, and alkali ingestion in the form of fruit juices. At this point it might be interesting to show what orange juice is when pictured in the way that Gamble first so brilliantly described the chemical anatomy of the body fluids (Fig. 12).

The next case, No. 14, was a girl aged 10 with relatively good respiratory adjustment, pH_s 7.08 for the low initial $(BHCO_3)_s$ of 4 mM per liter (Fig. 13). In response to 10 mM/Kg. Na-lactate, recovery of pH_s and $(BHCO_3)_s$ paralleled each other and were quite satisfactory.

The last case with good follow-up data (Fig. 14), No. 20, a girl aged 11, showed the best respiratory adjustment of all, pH_s 7.16 for initial $(BHCO_3)_s$ of 5.7 mM per liter. In response to 10 mM/Kg. Na-lactate the pathways of recovery of pH_s and $(BHCO_3)_s$ tended to converge, both slightly overshooting at the six-hour mark.

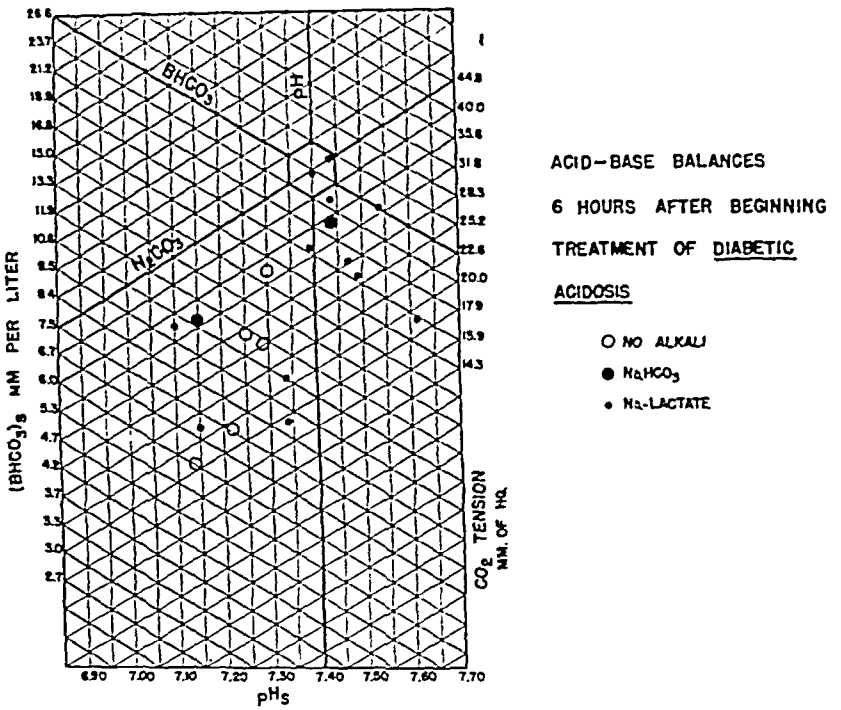
It should be fairly clear from the data presented thus far that the initial serum pH has a predictable influence on the later behavior of serum $BHCO_3$ during recovery. The superiority of our Na-lactate method of therapy as regards speed of recovery from acidosis can be visualized especially well when only recovery of serum $BHCO_3$ is followed during the first eight hours of treatment by the three methods under discussion (Fig. 15) and plotted against time. It will be noted that, on the average, as much is accomplished in two hours with the proper use of Na-lactate as is accomplished in eight hours without alkali administration, and that rise in serum $BHCO_3$ tapers off as the normal value is approached.

Finally, before summarizing the complete series of Na-lactate treated diabetics, we would like to point out another advantage of Na-lactate administration. On three occasions, once in our youngest diabetic of 8 months, and twice in infants of 14 months, we failed to diagnose the type of extreme acidosis with which the infants were brought to the hospital as *diabetic*, and in the early phase of treatment administered 10 mM/Kg. Na-lactate and 40 c.c./Kg. hypotonic Ringer's solution *without any insulin*. Note in Fig. 16 that each was recovering fairly well, in fact much faster than would have been predicted for patients receiving insulin but no alkali, before our error was discovered and insulin administered.

OVER-ALL SUMMARY OF Na-LACTATE TREATED PATIENTS WITH DIABETIC ACIDOSIS

In Table XII we have made an analysis of our entire group of children treated with sodium-lactate. Note that of the 123 treated over a 17-year period ninety-one, or 74 per cent, were either of extreme or severe degree. There were five deaths, all in the group of extreme severity. In no instance did death occur before acidosis was relieved, despite the fact that several lived but a short time after treatment was begun. Two children died from staphylococcus sepsis, one probably from pneumonia, and their deaths seemed unavoidable since they occurred before the days of effective chemotherapy. One death, however, was attended by hyperpyrexia, to which we believe we contributed largely by the administration of hypertonic (molar) Na-lactate despite de-

Fig. 4.


ACID–BASE BALANCES
6 HOURS AFTER BEGINNING
TREATMENT OF DIABETIC
ACIDOSIS
O NO ALKALI
● NaHCO3
• Na-LACTATE
(BHCO3)s MM PER LITER
BHCO3
pH
H2CO3
CO2 TENSION MM. OF HG.
6.90 7.00 7.10 7.20 7.30 7.40 7.50 7.60 7.70
pHs

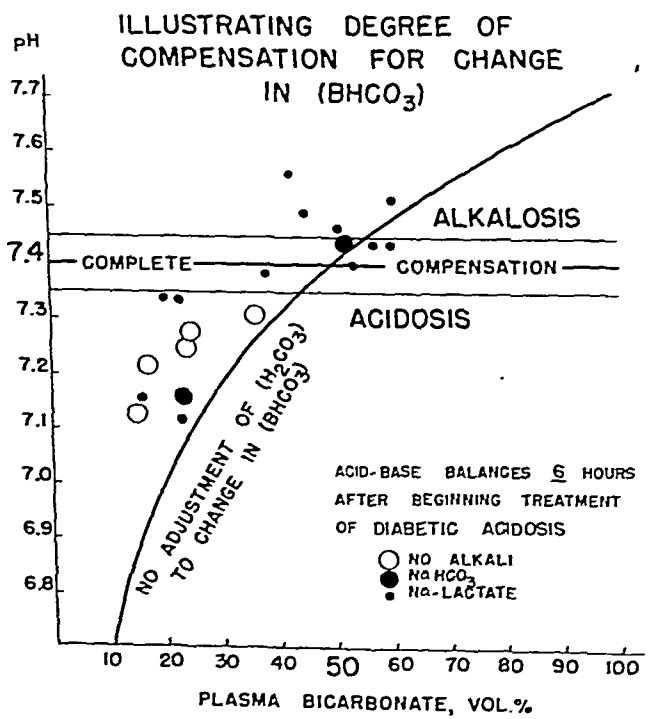

ILLUSTRATING DEGREE OF
COMPENSATION FOR CHANGE
IN (BHCO3)
pH
ALKALOSIS
COMPLETE
COMPENSATION
ACIDOSIS
NO ADJUSTMENT OF (H2CO3)
TO CHANGE IN (BHCO3)
ACID-BASE BALANCES 6 HOURS
AFTER BEGINNING TREATMENT
OF DIABETIC ACIDOSIS
NO ALKALI
NaHCO3
Na-LACTATE
PLASMA BICARBONATE, VOL.%

Fig. 5.

hydration in the presence of already high fever. This was at the very beginning of the studies and has been discussed previously in detail.[14] The fifth death seemed also unnecessary and resulted from cerebral and pulmonary edema following too-rapid administration of too much fluid intravenously.

Because of all these experiences, favorable and unfavorable, we think the details of our treatment are almost as important as the principles, and at the risk of repetition we shall outline them once more in Table XIII.

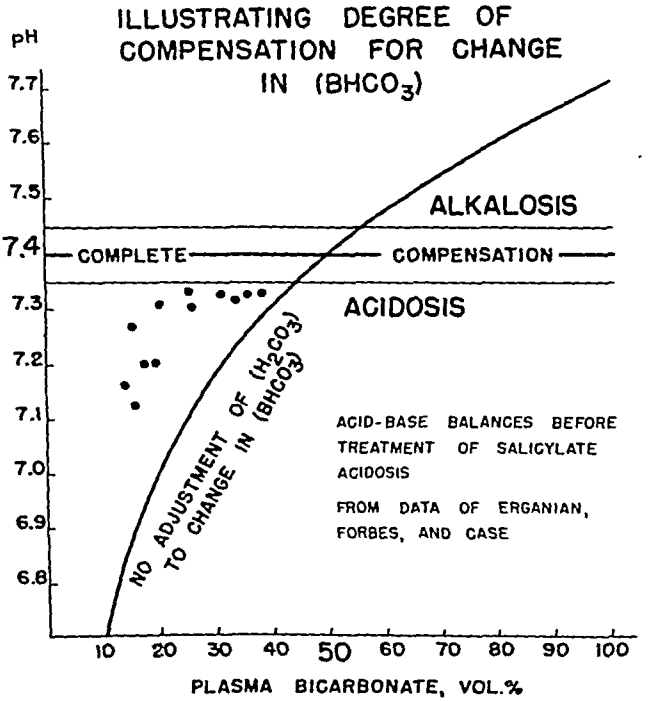


FIG. 17.

NONDIABETIC KETONE ACIDOSIS

Recently there has been an unusual opportunity to study other types of acidosis in which ketosis plays an important role, and a comparison of these with the diabetic is interesting.

In Fig. 17 we have data from twelve subjects, mostly infants, with severe salicylate intoxication. You will note immediately that, as compared with diabetics, their initial acid-base balances are quite good in that respiratory adjustment of $(H_2CO_3)_s$ has prevented much fall of pH_s, despite severe depletion of $(BHCO_3)_s$. The reason is twofold: in the first place, these infants were still strong because they were not seriously ill and were relatively well nourished and not severely dehydrated; in the second place they had a stimulus to respiration even stronger than acidosis—that of salicylate intoxication. The data in these infants were secured by Dr. Jane Erganian, together with Drs.

No. 18 because in the space of five months she twice required treatment of extreme degrees of acidosis. Data referable to treatment and response are shown in Tables VIII to XI and Fig. 6, inclusive. When seen first, on June 27, 1939 (Fig. 7), her initial acid-base balance is now shown on a different type of chart, where time in hours is recorded on the abscissa, while on the ordinate

TABLE VIII. TREATMENT OF DIABETIC ACIDOSIS: SEVERE DEHYDRATION AND KETOSIS

JUNE A.; AGE 14 YR.; WT. 50 KG.; JUNE 27, 28, 1939		
TIME	TREATMENT	DOSAGE (C.C.)
9:50 A.M.	Insulin HCl, 100 units subcutaneously (before laboratory confirmation)	
9:50 A.M.-11:30 A.M.	"Fortified" Lactate-Ringer's Sol. I.V.	1,500
10:00 A.M.-12:15 P.M.	"Fortified" Lactate-Ringer's Sol. Sub. C.	1,000
12:30 P.M.- 3:40 P.M.	⅙ molar Na r-lactate Sol. I.V.	1,500
3:40 P.M.- 5:00 P.M.	"Fortified" Lactate-Ringer's Sol. I.V.	2,100
9:40 P.M.- 2:00 A.M.	"Fortified" Lactate-Ringer's Sol. Sub. C.	400
Total		6,500

TABLE IX. JUNE A. RECOVERY FROM DIABETIC ACIDOSIS

		CAPILLARY BLOOD					VENOUS BLOOD		
DATE	TIME	Vc%*	pH	CO_{2b}† mM/L.	CO_{2s}‡ mM/L.	CO_2 VOL.%	SERUM CO_2 VOL.%	SERUM pH	SERUM TRUE GLUCOSE MG./100 C.C.
6/27/39	9:50 A.M.	48.5	6.88	4.2	4.8	10.9	6.5 (2.9mM)	6.91	448
	10:00 Treatment started								
	10:05	46.5	6.89	4.5	5.2	11.6			
	10:20	45.3	6.93	4.5	5.2	11.6			
	10:35	40.0	7.01	5.7	6.5	14.4			
	10:50	42.2	7.03	4.6	5.5	12.2			
	11:20	41.5	7.05						
	12:15 P.M.						13.9 (6.3mM)	7.15	
	12:20	41.0	7.20	5.1	6.0	13.2			
	1:30	47.0	7.28	6.6	8.0	17.8			
	2:20	51.0	7.40	12.5	15.8	35.2			
	3:25	42.0	7.57	15.1	18.7	41.7			
	3:30								35
6/28/39	4:30	27.5	7.62	22.3	25.7	57.2			
	6:30 A.M.								334
	2:00 P.M.						44.9 (20.2mM)	7.43	207

*Vc = hematocrit.
†CO_{2b} = CO_2 content whole blood in mM/L.
‡CO_{2s} = CO_2 content serum in mM/L.

TABLE X. TREATMENT OF DIABETIC ACIDOSIS
(MODERATE DEHYDRATION, SEVERE (?) KETOSIS)

JUNE A.; AGE 15 YR.: WT. 45 KG.; DEC. 10, 1939		
TIME	TREATMENT	DOSAGE (C.C.)
10:07 A.M.	Insulin HCl, subcutaneously	90 units
10:15 A.M.-11:15 A.M.	⅓ M. Na r-Lactate Sol. intravenously	675
11:15 A.M.- 3:00 P.M.	⅙ M. Na-Lactate Sol. subcutaneously	1,350
	+ Hypotonic Ringer's Sol.	1,800

TABLE XII. RESULTS IN DIABETIC ACIDOSIS TREATED WITH NA-LACTATE (1930-1946 INCLUSIVE, 123 CASES)

DEGREE ACIDOSIS	RECOVERED	DIED
Extreme acidosis (CO_2 cont. 6-14.9 vol. %) ($BHCO_3$ 2.5-6.3 mM/L.)	48	5 *Cause of death* Hyperpyrexia (1930) Pneumonia ? (1931) Staph. sepsis (1935) Staph. sepsis (1938) Water intoxication (1938)
Severe acidosis (CO_2 cont. 15-24.9 vol. %) ($BHCO_3$ 6.4-10.6 mM/L.)	43	0
Moderate acidosis (CO_2 cont. 25-34.9 vol. %) ($BHCO_3$ 10.7-14.8 mM/L.)	23	0
Mild acidosis (CO_2 cont. 35-44.9 vol. %) ($BHCO_3$ 14.9-19.1 mM/L.)	9	0

TABLE XIII. TREATMENT OF SEVERE DIABETIC ACIDOSIS

Initial
1. Insulin—2 units/Kg.
2. I.V. ⅙ M. Na-lactate—30 c.c./Kg. or 5 mM/Kg.
3. Subcutaneous ⅙ M. Na-lactate—30 c.c./Kg. or 5 mM/Kg.
4. Hypotonic Ringer's—40 c.c./Kg. or 4 m.eq. Cl/Kg.

At 6 Hours
1. Insulin—½ ± unit/Kg.
2. More subcutaneous ⅙ M. Na-lactate if necessary—5 mM/Kg.
3. Plasma, concentrated albumen or whole blood if necessary

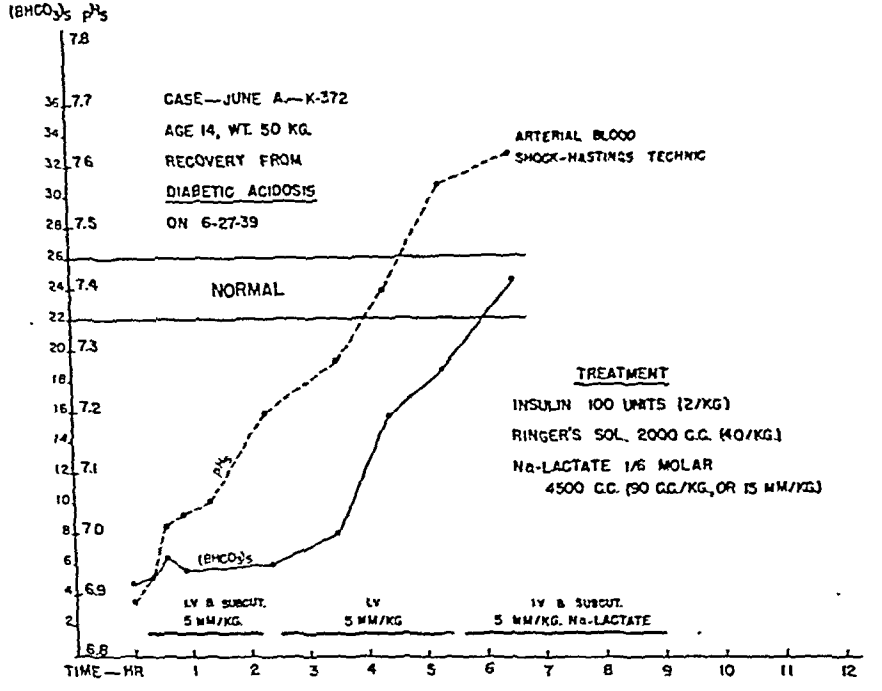
Forbes and Case and previously reported,[25] and in Fig. 18 are shown the recoveries of the three infants requiring the largest dose of Na-lactate, 15 mM/Kg. Note that recovery of pH_s parallels that of $(BHCO_3)_s$, but that, considering the dose of alkali administered, the *rate* of recovery of each is relatively slow.

Still slower is the recovery from milkweed poisoning (Fig. 19). Note that the time scale had to be changed fourfold. In this type of poisoning, as in salicylate intoxication, ketogenesis does not cease with insulin administration as in diabetes, but may persist for several days, despite much glucose administration which is indicated along with Na-lactate.

REFERENCES

1. Hartmann, A. F.: M. Clin. North America 9: 1, 1925.
2. Gamble, J. L.: New Eng. J. Med. 201: 909, 1929.
3. Hoag, L. A., and Marples, E.: Proc. Soc. Exper. Biol. & Med. 26: 374, 1929.
4. Hoag, L. A., and Marples, E.: Am. J. Dis. Child. 42: 291, 1931.
5. Joslin, E. P., Root, H. P., White, P., and Marble, A.: J. A. M. A. 105: 359, 1935.
6. Joslin, E. P., Root, H. P., White, P., Marble, A., and Joslin, A. P.: Arch. Int. Med. 59: 175, 1937.
7. Peters, J. P., Bulger, H. A., Eiseman, A. J., and Lee, C.: J. Clin. Investigation 2: 167, 1925.
8. Hartmann, A. F.: Am. J. Dis. Child. 25: 557, 1928.
9. Hartmann, A. F., and Darrow, D. C.: J. Clin. Investigation 6: 257, 1928.
10. Hartmann, A. F., and Elman, R.: J. Exper. Med. 50: 387, 1929.
11. Hartmann, A. F.: Colorado Med. 26: 373, 1929.
12. Hartmann, A. F., and Senn, M. J. E.: J. Clin. Investigation 11: 337, 1932.
13. Marriott, W. McK., Hartmann, A. F., and Senn, M. J. E.: J. PEDIAT. 111: 181, 1933.

Fig. 7.


(BHCO3)S pHS
CASE—JUNE A.—K-372
AGE 14, WT. 50 KG.
RECOVERY FROM
DIABETIC ACIDOSIS
ON 6-27-39
ARTERIAL BLOOD
SHOCK-HASTINGS TECHNIC
NORMAL
pHS
(BHCO3)S
TREATMENT
INSULIN 100 UNITS (2/KG)
RINGER'S SOL. 2000 C.C. (40/KG.)
Na-LACTATE 1/6 MOLAR
4500 C.C. (90 C.C./KG., OR 15 MM/KG.)
I.V. & SUBCUT.
5 MM/KG.
I.V.
5 MM/KG
I.V. & SUBCUT.
5 MM/KG. Na-LACTATE
TIME—HR

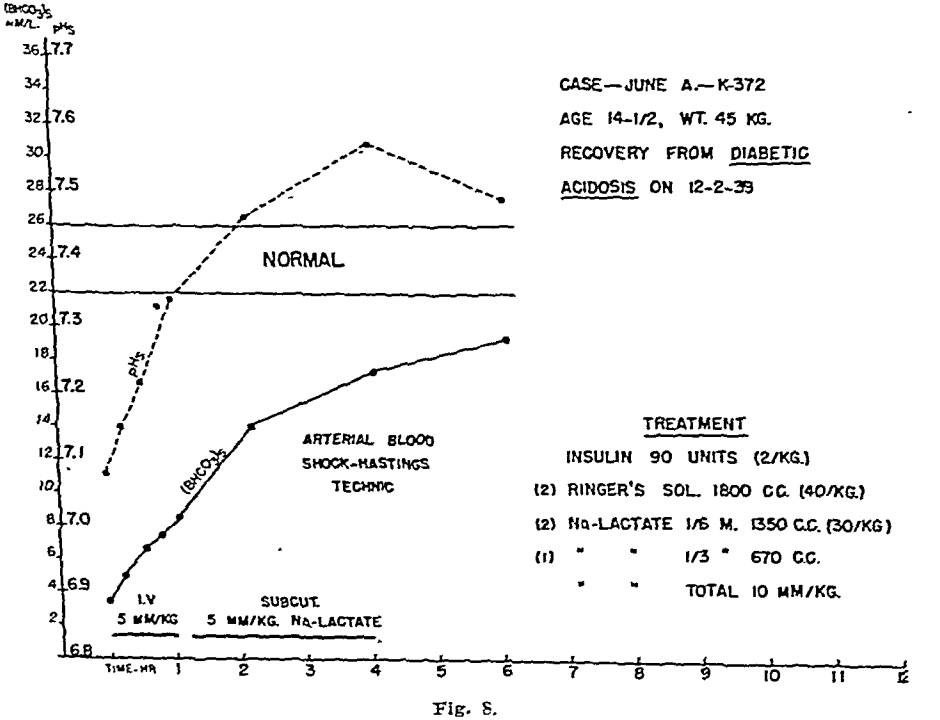

(BHCO3)S MM/L. pHS
CASE—JUNE A.—K-372
AGE 14-1/2, WT. 45 KG.
RECOVERY FROM DIABETIC
ACIDOSIS ON 12-2-39
NORMAL
pHS
(BHCO3)S
ARTERIAL BLOOD
SHOCK-HASTINGS
TECHNIC
TREATMENT
INSULIN 90 UNITS (2/KG.)
(2) RINGER'S SOL. 1800 C.C. (40/KG.)
(2) Na-LACTATE 1/6 M. 1350 C.C. (30/KG.)
(1) " " 1/3 " 670 C.C.
" " TOTAL 10 MM/KG.
I.V.
5 MM/KG
SUBCUT.
5 MM/KG. Na-LACTATE
TIME-HR

Fig. 8.

STUTTERING, A REORIENTATION

W. Hugh Missildine, M.D., and Philip J. Glasner
Baltimore, Md.

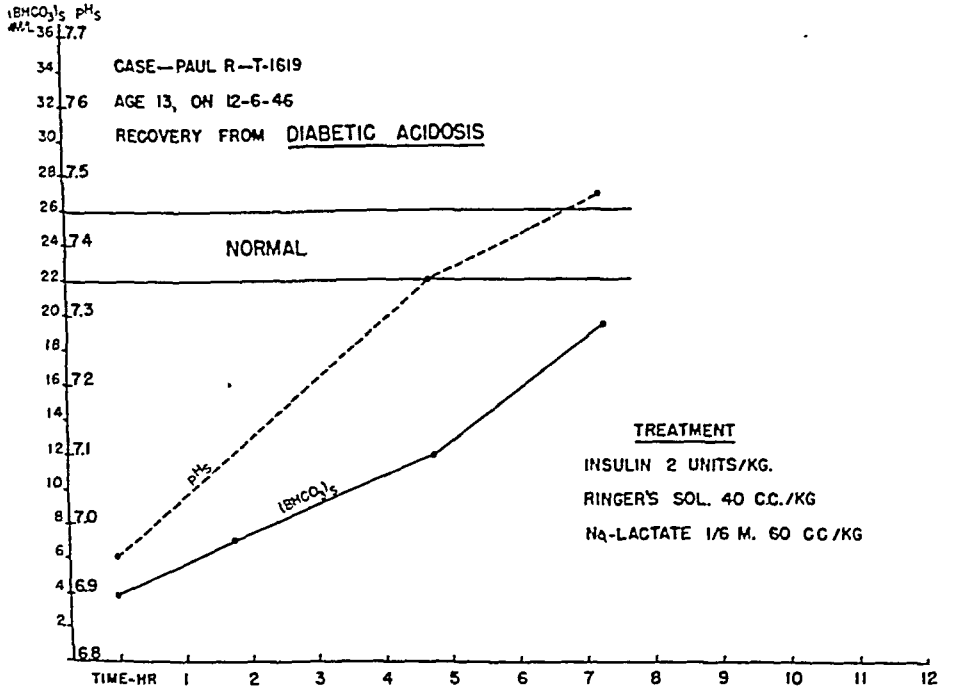
STUTTERING, in spite of the wealth of published matter that has accumulated, is still one of the most controversial and misunderstood problems which confronts the pediatrician. There are now over one million stutterers in the United States. This large group of persons merits our persistent efforts at better understanding, since their handicap is a continuous source of suffering to them. Van Riper[1] states that seven times as many stutterers contemplate suicide as normal speakers. Adult stutterers tend to go into vocations far below their capacities in order to avoid speaking situations. They often lead misshapen, unhappy lives because of their speech difficulty.

Because the literature until recently has been so contradictory, the physician often dealt with the stuttering child by telling the mother one of two things: that the child would outgrow his speech trouble or that the problem should wait until the child attained school age, at which time he could be enrolled in a speech correction class. Neither suggestion deals with the basis of the child's difficulty. Experience has shown that only those children "outgrow" stuttering whose environmental tensions are eased, purposely or accidentally. A group speech correction class for a child merely concentrates his attention on his defect and does not remove the underlying emotional causes of it. The purpose of this paper is to bring together some of the more recent advances in the understanding of stuttering and to present a point of view which attends more to the child who is saddled with the speech difficulty than to the difficulty itself.

Whereas stuttering has been described at various times as caused by "transient auditory amnesia" (Bluemel[2]), "diminution of the power of visualization" (Swift[3]), and "lack of development of a dominant cerebral hemisphere" (Travis),[4] the majority of workers now agree that stuttering is essentially functional or psychogenic in origin. Two observations strongly support the latter view. The first is that if preschool children are relieved of the distressing emotional tensions of their environment, their stuttering ceases even though no attention, professional or otherwise, has been given to their speech. The second observation is that in primitive cultures where there are no pressures put on children to speak correctly, there are no stutterers.

Johnson[5] found that he could help three out of four preschool children to regain normal speech by directing his total therapeutic efforts to the attitudes of parents and the other adults influencing the child. Johnson reported, "The children are not talked to about their speech, nor are they given instructions as to how they should speak. Treatment was directed to the semantic environment. An attempt was made to change parental attitudes and policies, so that an environment would be formed in which there would be a minimum of anxiety, tension, and disapproval. The parents were to let the child know his speech was

Fig. 10.


(BHCO3)s pHs
mM
CASE—PAUL R—T-1619
AGE 13, ON 12-6-46
RECOVERY FROM DIABETIC ACIDOSIS
NORMAL
pHs
(BHCO3)s
TREATMENT
INSULIN 2 UNITS/KG.
RINGER'S SOL. 40 CC./KG
Na-LACTATE 1/6 M. 60 CC/KG
TIME-HR

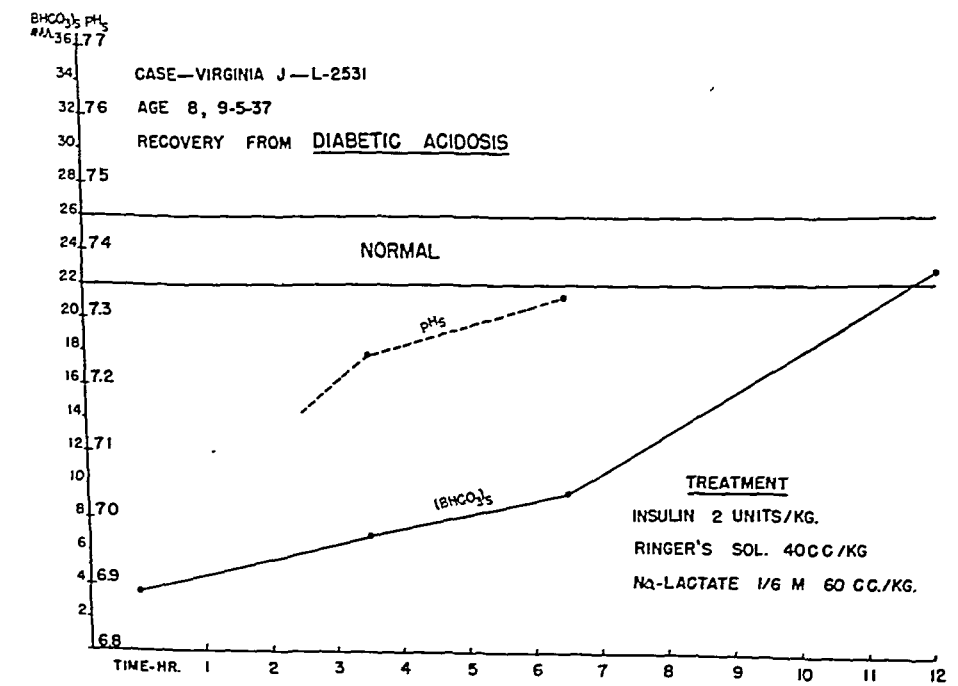

BHCO3)s pHs
mM
CASE—VIRGINIA J—L-2531
AGE 8, 9-5-37
RECOVERY FROM DIABETIC ACIDOSIS
NORMAL
pHs
(BHCO3)s
TREATMENT
INSULIN 2 UNITS/KG.
RINGER'S SOL. 40CC/KG
Na-LACTATE 1/6 M 60 CC./KG.
TIME-HR.

Fig. 11.

to help the child's speech by merely easing the emotional tensions within his home. The problem then becomes more complex because the child has internalized much of the environmental conflict surrounding him. A pluralistic therapy which combines direct speech training, skilled individualized psychotherapy, and environmental manipulation becomes necessary for the stuttering school child.

We have emphasized that stuttering is a psychogenic disorder developing in a matrix of emotional tensions during the child's speech development period from 2 to 4 years of age. It follows, then, that the actual causes of stuttering are highly individual, since the causes of tensions differ with each family constellation. Because the underlying causes for each child's speech trouble are so highly individualized, their understanding is sometimes obscured by lumping "cases" together for various statistical purposes. But there are certain facts which can be obtained in no other way. Some of these are:

1. Stuttering is more common in boys than in girls. The ratio varies with the authority from 3:1 to 8:1.

2. Stutterers do poorly on the Ozeretsky Tests for motor coordination (Kopp),[11] but their coordination improves after psychotherapy (Despert).[7]

3. Stuttering appears and disappears with changes in the social environment and in conversational relationships in which the patient is involved (West).[12]

4. Each child has his own individual stuttering pattern.

5. When alone, when singing, and when reading in unison with others, a large number of stutterers speak fluently.

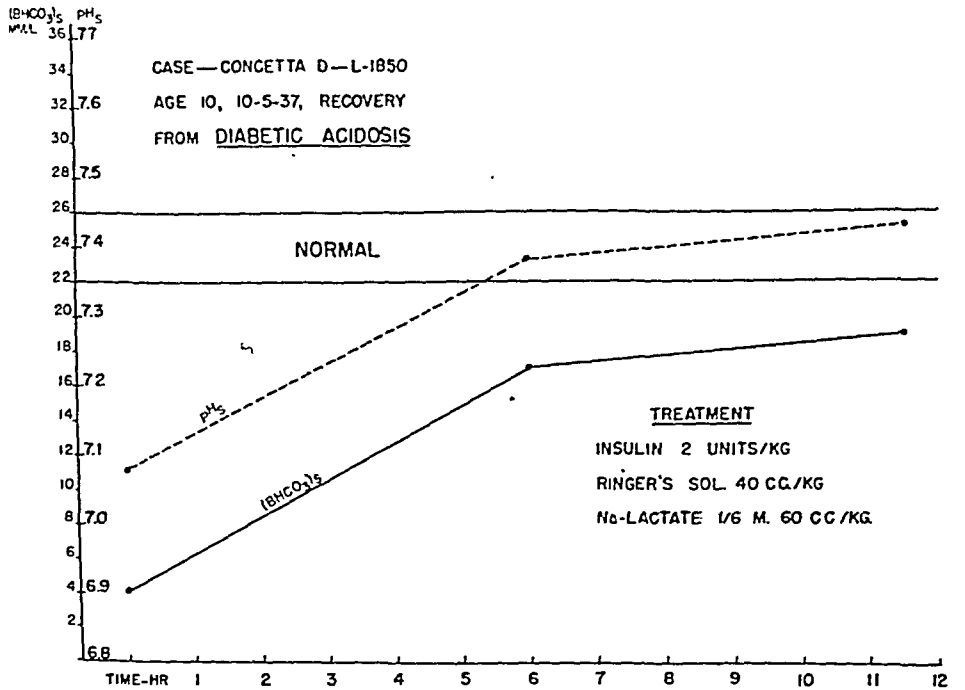
There are certain tension producing factors in the environment of these children that recur with sufficient frequency to deserve special mention.

1. The mothers of stutterers are commonly found to be domineering, perfectionistic, overprotective mothers who are overanxious about the feeding and health of their child. In a recent study, Despert[10] reported that 36 out of 50 mothers of stuttering children were of this type. Such mothers create in their children an excessive amount of restlessness by their anxious coercion, especially during meals, and they inhibit their children's motor activity by an overprotective concern for their health and safety.

2. Overanxiety about the normally repetitive speech of small children is often present in the family background of stutterers. Many parents, especially those who have stuttered, become unduly anxious because of these normal repetitions. As far as a stutterer is concerned, there is nothing more horrible than stuttering. So he corrects his child, tells him to go slowly, to think before he speaks, etc. The child, in consciously attempting to control his speech, stutters even more. So common is this concern over normal repetition that Johnson[5] has spoken of stuttering as a "diagnosogenic" disorder in the sense that the diagnosis of stuttering in a young child by parents and the subsequent attempts on their part to correct his speech is one of the causes of the disorder.

The following cases demonstrate some of the emotional factors in the background of our stuttering children.

Fig. 13.


(BHCO3)S MM/L
pHS
CASE—CONCETTA D—L-1850
AGE 10, 10-5-37, RECOVERY
FROM DIABETIC ACIDOSIS
NORMAL
pHS
(BHCO3)S
TREATMENT
INSULIN 2 UNITS/KG
RINGER'S SOL. 40 CC./KG
Na-LACTATE 1/6 M. 60 CC./KG.
TIME-HR

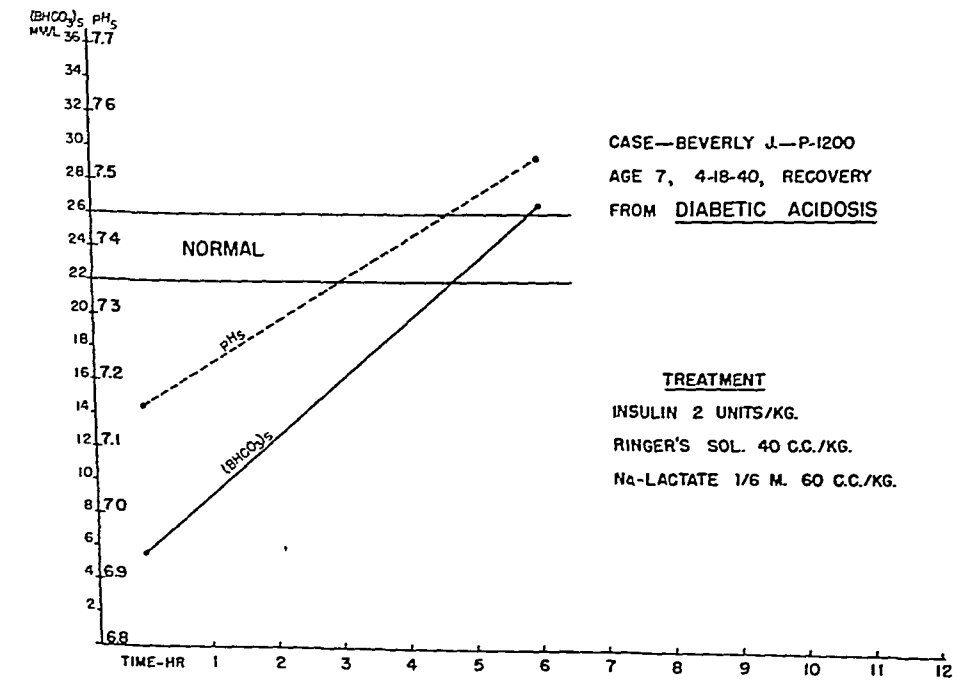

(BHCO3)S MM/L
pHS
CASE—BEVERLY J.—P-1200
AGE 7, 4-18-40, RECOVERY
FROM DIABETIC ACIDOSIS
NORMAL
pHS
(BHCO3)S
TREATMENT
INSULIN 2 UNITS/KG.
RINGER'S SOL. 40 C.C./KG.
Na-LACTATE 1/6 M. 60 C.C./KG.
TIME-HR

Fig. 14.

hospital for seven weeks and after that he started to stutter. He is always so afraid I'm going to leave him. He bites his nails terribly."

This mother kept stopping the boy in speaking situations in an effort to correct his stuttering. She was overconcerned about his keeping neat and clean, and at the time of his admission to the clinic she was still dressing him. She always gave him anything he wanted and was continually fearful that he would get hurt. She would not let him ride streetcars alone and insisted that he hold her hand when they crossed streets.

Mrs. C. is a 33-year-old woman who, after high school, worked for eight years as a clerk in a department store. She was tense, obese, and subject to crying spells.

Mr. C. was a policeman. An impatient man, subject to anger outbursts, he was stern with the boy and frequently quarreled with his wife over the boy's discipline.

Robert was an only child. He was prematurely delivered by cesarean section and weighed only 3 pounds at birth. However, his early development was normal. He did average work in school and behaved very well. His I.Q. was 107. He was right-handed, right-footed and left-eyed.

This boy was prematurely born, so that a great amount of attention was focused on him in infancy. He was the only son of an unstable, fearful, overprotective mother and a stern, easily angered father. In addition to the insecurity this boy felt because of his mother's anxious overprotection and the parental arguments about his discipline, he was constantly cautioned about keeping neat and clean, about speaking correctly and about not overeating.

This boy also had a full program of psychotherapy and speech correction and his parents were frequently seen in order to bring about a healthier relationship between parents and child. Robert has responded to these efforts by speaking without suttering, by losing 20 lbs. of excess weight, and by stopping his enuresis. The satisfactory solution of this problem took almost two years of weekly interviews to accomplish.

CONCLUSIONS

The literature on stuttering is controversial, but most authorities now agree that it is a functional or psychogenic disorder rather than an organic one.

Stuttering begins between the ages of 2 to 4, and departs from normal childhood repetitious speech as a result of insecurity feelings engendered by emotional tensions within the home environment.

Some of the more common factors causing these emotional tensions are listed.

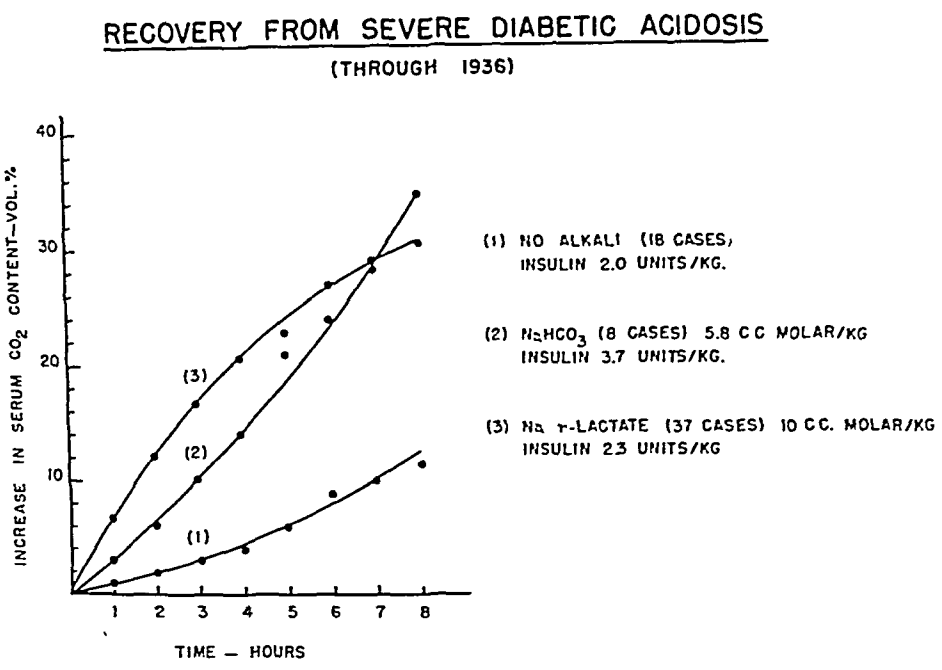
Preschool children can be helped by treatment directed to the adult environment surrounding them. The correction of faulty parental attitudes and the easing of environmental tensions are often all that is needed for them to regain normal speech.

Speech correction classes at school, which attempts to teach stutterers as a group, focuses more attention on the child's defective speech while ignoring the individual emotional causes of it, and thus tends to aggravate the speech difficulty.

School children, especially those 7 years of age or older, need a more thorough therapeutic regimen, including speech training, individualized psychotherapy, and environmental manipulation in order to cope adequately with their more complex problem.

In the light of our recently acquired insight, then, the pediatrician will think of his young patient's stuttering as a symptom of an underlying emotional disturbance, just as he thinks of fever as an indication of an underlying infection. He will seek the causes of this inner unrest by investigating the attitudes

Fig. 15.


RECOVERY FROM SEVERE DIABETIC ACIDOSIS
(THROUGH 1936)
INCREASE IN SERUM CO_2 CONTENT—VOL.%
40
30
20
10
(3)
(2)
(1)
1 2 3 4 5 6 7 8
TIME — HOURS
(1) NO ALKALI (18 CASES) INSULIN 2.0 UNITS/KG.
(2) $NaHCO_3$ (8 CASES) 5.8 C C MOLAR/KG INSULIN 3.7 UNITS/KG.
(3) Na r-LACTATE (37 CASES) 10 C C. MOLAR/KG INSULIN 2.3 UNITS/KG

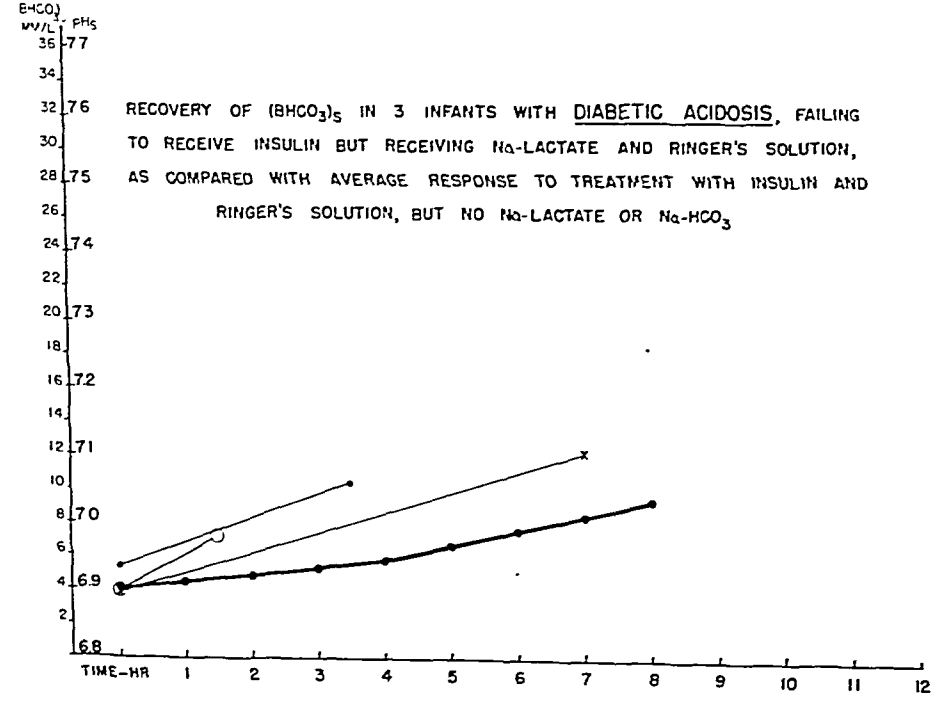

$(BHCO_3)$ MV/L
pHs
36 77
34
32 76
30
28 75
26
24 74
22
20 73
18
16 72
14
12 71
10
8 70
6
4 6.9
2
6.8
TIME-HR 1 2 3 4 5 6 7 8 9 10 11 12
RECOVERY OF $(BHCO_3)_S$ IN 3 INFANTS WITH DIABETIC ACIDOSIS, FAILING TO RECEIVE INSULIN BUT RECEIVING Na-LACTATE AND RINGER'S SOLUTION, AS COMPARED WITH AVERAGE RESPONSE TO TREATMENT WITH INSULIN AND RINGER'S SOLUTION, BUT NO Na-LACTATE OR $Na-HCO_3$

Fig. 16.

EPIDEMIOLOGIC STUDIES IN DENTAL CARIES

II. The Incidence of Caries Among Institutionalized Children

Julian D. Boyd, M.D., and Virgil D. Cheyne, D.D.S.
Iowa City, Iowa

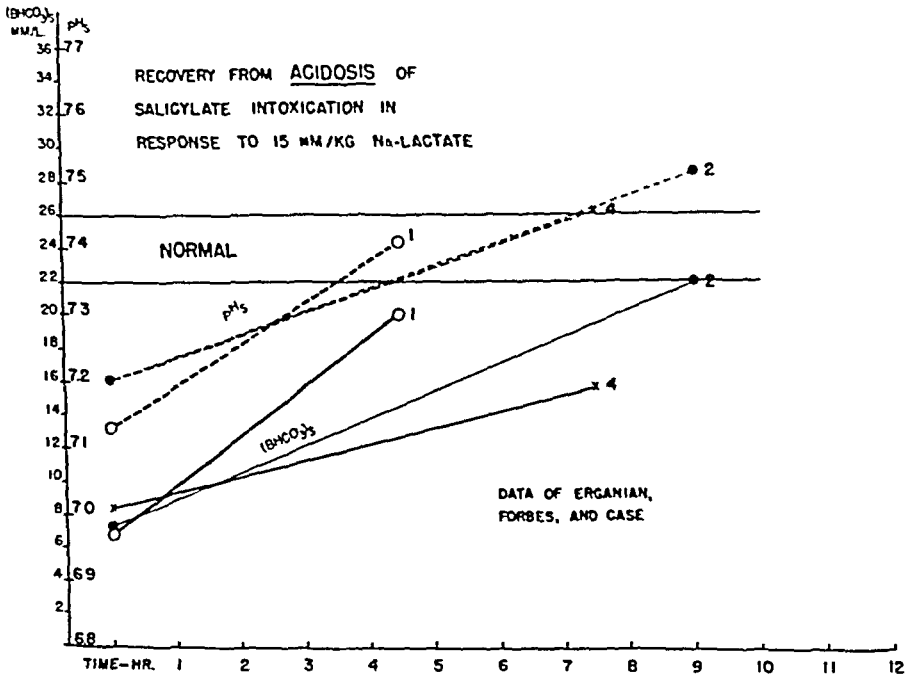
THE incidence and extent of tooth decay among children cannot be clearly defined by a simple statement of an average value. Dental caries is inconstant as to incidence and rate of progression, not only for the whole child population but for a given child from one period to another.[1] With regimentation of certain conditions of living, however, there tends to less variability of caries experience. Recognizing this fact, and as a means of approach to the study of the possible effect of specific factors on caries evolution, one may gain valuable information from the manner in which caries manifests itself within various defined child populations. The extensive studies of the children of Hagerstown, Md., conducted by members of the United States Public Health Service, provide a reliable source of reference concerning a specified general school population.[2] For several years, similar studies have been under way at the State University of Iowa under the joint sponsorship of the Departments of Pediatrics and Pedodontics, of the Colleges of Medicine and Dentistry. The first report of the present series dealt with the caries course of children seen recurrently in the Children's Clinic of the Dental College.[1] The current report is based on the analysis of dental data from children living in six custodial institutions in the State of Iowa. The data have been analyzed to permit study of the possible effect of certain factors on the dental caries picture. These factors included the sex and age of the subject, the particular institution in which he lived, the duration of residence there, recent exposure to fluorine ingestion, dental hygienic practices, the extent of reparative dental therapy, and conditions of environment which were common or peculiar to specific institutions.

The current study was begun in the summer of 1944, and certain phases of the findings have been reported.[3] The earlier data were supplemented during the summer of 1946 through examinations made in a school for the feeble-minded. The assembled data from all of the institutions include records of 619 children between the ages of 6 and 19 years (Table I). The subject population was not evenly divided between the various institutions, nor was the age distribution equal. Of the subjects, 15 per cent were in the first decade of life; more than one-half were 14 years old or older. The institutions included two orphanages, an industrial school for boys, and a school for the feeble-minded, all populous and under state control; also included were two small Catholic orphanages. The latter two institutions contributed only 10 per cent of the total child population with an age range limited principally from 8 to 13 years.

From the Departments of Pediatrics and Pedodontics, Colleges of Medicine and Dentistry, State University of Iowa.

Reported in substance before the American Pediatric Society, Stockbridge, Mass., May 14, 1947, and before the International Society for Dental Research, Chicago, Ill., June 12, 1947.
This study was financed in part through a grant from the Sugar Research Foundation.

Fig. 18.


RECOVERY FROM ACIDOSIS OF
SALICYLATE INTOXICATION IN
RESPONSE TO 15 mM/KG Na-LACTATE
NORMAL
pHs
(BHCO3)s
DATA OF ERGANIAN,
FORBES, AND CASE
TIME-HR

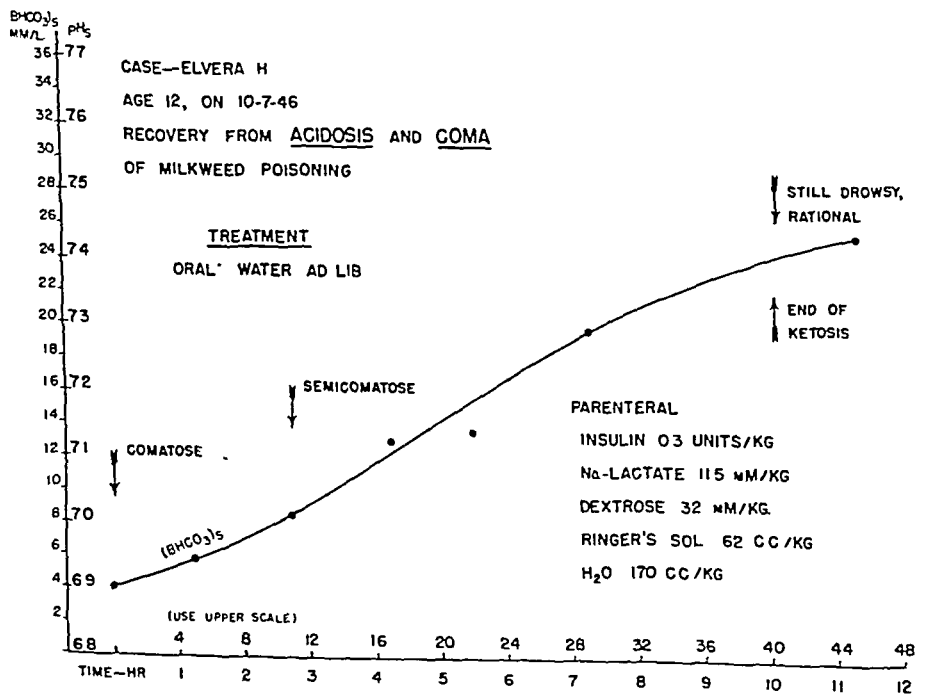

CASE—ELVERA H
AGE 12, ON 10-7-46
RECOVERY FROM ACIDOSIS AND COMA
OF MILKWEED POISONING
TREATMENT
ORAL WATER AD LIB
STILL DROWSY, RATIONAL
END OF KETOSIS
SEMICOMATOSE
COMATOSE
PARENTERAL
INSULIN 03 UNITS/KG
Na-LACTATE 115 mM/KG
DEXTROSE 32 mM/KG
RINGER'S SOL 62 CC/KG
H2O 170 CC/KG
(USE UPPER SCALE)
TIME-HR

Fig. 19.

TABLE I. NATURE AND SOURCE OF SUBJECT PERSONNEL

NO., AGE, AND DURATION OF RESIDENCE OF SUBJECTS	INSTITUTION NUMBER AND NATURE						
	1 STATE ORPHANAGE	2 STATE SCHOOL*	3 CHURCH ORPHANAGE	4 STATE ORPHANAGE	5 CHURCH ORPHANAGE	6 STATE SCHOOL†	TOTALS
Number of subjects:							
Boys	56	90	17	73	19	124	379
Girls	41	0	12	58	11	118	240
Total	97	90	29	131	30	242	619
Age range of subjects:							
Total range	10-19	10-19	6-14	11-19	8-14	6-19	6-19
Median value	14	16.5	9	13	11	14	14
Middle half of range	13-16	15-17	8-12	12 15	9-12	11-16	12-16
Duration of residence in institution (years):							
A. Those 6 to 13 years old:							
Median	3		3	4	2	3	
Mode	2		3	9	2	2	
B. Those 14 to 19 years old:							
Median	3	2		6		5	
Mode	2	2		9		9	
C. All subjects:							
Total range	-1 to 7	-1 to 7	-1 to 6	-1 to 9+	-1 to 9+	- 1 to 9+	-1 to 9+
Median value	2	2	3	5	2	4	3
Middle half of range	1-4	2-3	2-4	3-7	2-3	2-7	2-6

*Industrial school for boys.
†School for the feeble-minded.

14. Hartmann, A. F., Perley, A. M., Basman, J., Nelson, M. V., and Asher, C.: J. PEDIAT. 13: 692, 1938.
15. Hartmann, A. F.: Student Notes on Parenteral Fluid Administration, 1940.
16. Hartmann, A. F.: Washington University Medical Alumni Quarterly, Oct., 1942.
17. Hartmann, A. F., Lawler, H. J., and Meeker, C. S.: J. PEDIAT. 24: 371, 1944.
18. Butler, A. M., and Talbot, N. B.: New Eng. J. Med. 231: 585, 1944.
19. Levine, S. Z.: J. PEDIAT. 26: 196, 1945.
20. Weihl, C., Rapoport, S., and Dodd, K.: J. PEDIAT. 30: 45, 1947.
21. Darrow, D. C.: J. PEDIAT. 28: 515, 1946.
22. Peters and Van Slyke: Quantitative Clinical Chemistry, Baltimore, 1931, Williams and Wilkins Co., p. 894.
23. Hastings, A. B., and Steinhaus, A. H.: Am. J. Physiol. 96: 538, 1931.
24. Gamble, J. L.: Chemical Anatomy, Physiology and Pathology of Extracellular Fluids. Dep't of Pediatrics, Harvard Medical School, 1941. Chart 10.
25. Erganian, J. A., Forbes, G. B., and Case, D. M.: J. PEDIAT. 30: 129, 1947.

TABLE III. INCIDENCE OF CARIES OF PERMANENT TEETH IN TERMS OF PLACE OF RESIDENCE

	INSTITUTION NUMBER						
	1	2	3	4	5	6	TOTALS
A. Subjects 6 to 9 years old, inclusive:							
Number subjects	0	0	16	0	10	37	63
Median age, months			93		107	97	97
Subjects with no caries			5		0	6	11
Number DMF* surfaces:							
Median value			*2*		*6*	*4*	*4*
Middle half of range			1-3		2-7	1-6	1-5
Total range of values			0-6		1-10	0-9	0-10
Extracted permanent teeth			0		0	2	2
Average number per child			0		0	0.06	0.03
Untreated caries (per cent unfilled)			79		96	100	96
B. Subjects 10 to 13 years, inclusive:							
Number subjects	37	3	9	61	17	74	201
Median age, months	152	138	145	148	143	147	
Subjects with no caries	3	1	0	8	0	0	12
Number DMF* surfaces							
Median value	*6*	*2*	*6.5*	*7*	*11*	*6*	*6*
Middle half of range	2-7		2-9	4-9	7-16	4-8	3-9
Total range of values	0-32	0-9	1-10	0-24	4-11	1-18	0-32
Extracted permanent teeth	5	0	0	0	0	10	15
Average number per child	0.135	0	0	0	0	0.135	0.075
Untreated caries (per cent unfilled)	56	100	57	47	92	95	73
C. Subjects 14 to 19 years, inclusive:							
Number subjects	60	88	3	69	4	131	355
Median age	180	199	172	181	167	194	
Subjects with no caries	1	1	0	0	0	4	6
Number DMF* surfaces							
Median value	*10*	*14*	*9*	*11*	*13*	*8*	*10*
Middle half of range	5-17	7-20		6-14		5-13	6-15
Total range of values	0-32	0-31	5-16	0-28	9-16	0-25	0-32
Extracted permanent teeth	40	64	0	8	2	66	180
Average number per child	0.67	0.73	0	0.12	0.04	0.50	0.50
Untreated caries (per cent unfilled)	47	85	60	41	80	91	73

*DMF implies decayed, missing or filled; each extracted tooth is assumed to have had three carious surfaces.

TABLE IV. CARIES INCIDENCE IN TERMS OF SEX FOR SUBJECTS AGED 14 TO 19 YEARS IN THREE CONTRASTED INSTITUTIONS

	NO. SUBJECTS	DMF* SURFACES		NO. EXTRACTED TEETH	NO. SUBJECTS WITH NO CARIES	MEDIAN AGE OF SUBJECTS (MO.)
		MEDIAN VALUE	MIDDLE HALF OF RANGE			
Institution 1						
Boys	29	*11*	5-21	14	1	181
Girls	31	*10*	7-16	26	0	180
Institution 4						
Boys	41	*10*	6-14	4	0	177
Girls	28	*11*	7-14	4	0	191
Institution 6						
Boys	67	*8*	4-13	35	2	193
Girls	64	*9*	5-13	31	2	195

*DMF implies decayed, missing or filled; each extracted tooth is considered to have had three carious surfaces.

approved regardless of how he spoke. Another measure was to bring about a more friendly relationship between parents and their child. Their tendency to be critical and disapproving tended to make for generally strained relations and for apparent feelings of insecurity on the part of the child.

"In general, then, the treatment is to be directed not toward the child, but toward the relevant evaluations—the attitudes, assumptions, beliefs, etc., and the resulting policies and reactions of the child's parents and teachers and other persons who affect his own evaluations and reactions."

Primitive peoples do not have the problem of stuttering. Harriett Hayes,[6] a teacher on an Indian reservation in Idaho, was unable to find any stuttering Indians. Their standards of child care and training appeared to be extraordinarily lax in comparison with our own. Particularly in regard to speech, it seemed that every Indian child was considered a satisfactory or normal speaker regardless of the manner in which he spoke. Helen Bradley[6] of the U. S. Indian School at Albuquerque, New Mexico, reported that she had never seen a case of stuttering in her school. Margaret Mead[6] commented, "I have never seen stuttering among any of the primitive peoples whom I have studied." Dr. Lloyd C. Warner[6] said that there were no cases in any of the Australian tribes which he had studied. Surely if the causes for stuttering were organic and not functional, it would be found among all peoples, and it would be refractory to the treatment of manipulating the parental attitudes affecting the preschool child.

Despert[7] and Johnson[8] have shown that children begin to stutter between the ages of 2 and 4. At this time they are not only learning to speak in sentences, but they are mastering the art of feeding themselves and are bringing the complex functions of urination and defecation under voluntary control. This is the so-called "period of resistance," at which time the emerging egos of children declare their independence. In this same period many parents are obsessively anxious over the correct "habit training," weight gain, and other developmental phenomena of their children. Conflicts arise between children who are learning, among other things, how to say no, and adults who are desperately trying to "mold" their charges to some preconceived pattern.

As for speech, the vocabulary of preschool children increases several hundred per cent in the space of a few months. In their groping and repeating in an effort to express themselves, they all do some of those things which in adults we characterize as stuttering. Davis[9] has demonstrated that hesitating, repetitious speech is more or less characteristic of young children generally. The development of normal speech will proceed if this 2- to 4-year period is relatively free of emotional tensions. However, if the emotional upheaval in the home is considerable, the child's resultant insecurity feelings may manifest themselves in stuttering. Correcting his speech, interrupting him, and telling him to speak more slowly only focus more of his attention on his speech, augment his feelings of insecurity, and aggravate his speech difficulty.

Later on, the school-age child's stuttering begins to prevent his social adaptation, thereby increasing his anxiety and further fixating his speech trouble. Usually, by the time he is 7 years old, the opportunity has been lost

Summarizing and comparing these various indices relating to caries, it will be noted that the institution with the lowest median carious incidence in the 14- to 19-year-old group (number 6) was also the most populous, and that its subjects had the highest relative incidence of unfilled cavities and of poorly kept mouths: the incidence of extracted teeth stood at the median level for all subjects of that age group. In contrast, the institution with the highest median caries score (number 2) stood highest as to the relative incidence of extractions, was second in number of subjects, about median as to oral hygiene, and next to the highest as to incidence of unfilled cavities.

One might question the validity of comparing dental findings among two populations, one of which was limited to boys while the other included both sexes. We observed no notable or consistent difference as to the extent of caries between the two sexes, and because of the commonness of caries experience it has been deemed justifiable to use pooled data for both sexes in our analyses. Table IV provides a comparison of caries incidence among boys and girls in the three institutions which housed both sexes and where the number of subjects was sufficient to give validity to the comparison. Although the table lists only subjects 14 years old or older, *sex variance was not evident* in any group living under the same conditions.

A reasonable explanation for the difference in caries incidence between the subjects from institutions 2 and 6 becomes apparent when one observes the correlation between the duration of residence under custodial conditions and the median caries scores. This is shown in Table V. Only those individuals who were 12 years old or older have been considered in this table. Duration of residence has been divided into three categories: less than four years, four to seven years, and longer than seven years. Summating all of the values for those 14 to 19 years old, the average number of DMF surfaces for each of the three mentioned groups was 13.6, 11.6, and 10.6, respectively. This downward trend of the means makes it obvious that *caries incidence has been lessened through prolonged institutional residence.* The difference between the means for those with the shortest and the longest period of residence is highly significant.

As a corollary of the caries incidence in terms of age, we have calculated the *average annual increment of caries progression.* Calculation was based on the premise that eruption of the permanent teeth had begun at the age of 6 years. For any group of children the rate could be obtained by dividing the total number of affected tooth surfaces by the pooled values (for age in years minus six) for each child included in the group. Values were calculated for all subjects aged 8 to 12, 13 to 15, and 16 to 19 years old, inclusive. The resultant figures are shown in Table VII, together with a separate consideration within each group for those who had been in residence for six years or longer, and further for those in residence at least nine years. The values ranged from a high of 1.3 to a low of 0.7 newly carious surfaces per annum; those with the longest period of residence had the lowest increment value. This illustrates again the trend for caries progression to decelerate with prolonged institution life.

Lactobacillus acidophilus studies of saliva were made as a part of the dental examinations of the children in institutions 2, 3, 4, and 5. The results of these

CARL A. was a blonde, physically healthy, neatly dressed 7-year old boy who was brought into The Children's Psychiatric Service of the Harriet Lane Home for Invalid Children, The Johns Hopkins Hospital, by his mother because of stuttering which had started before his entrance into kindergarten. His mother said that he was always "lazy" in his speech. Up until the age of 4 he said very little, but pointed to objects in order to make his wishes known. He began to stutter before he started school, but in the past year his stuttering had become much worse. He wasn't interested in his second-grade studies and his teacher had very little patience with him. His mother expressed this attitude:

"He doesn't seem to care that he stutters. I get after him quite a bit about it, but he doesn't care. I've corrected him about it more in the past year, but it hasn't done any good. He doesn't concentrate. When I help him with his schoolwork he just doesn't seem to think. I go over and over his homework with him, but it doesn't help. I told him that if he doesn't get his lessons he won't get to play in the afternoon after school.

"He eats and sleeps well. He occasionally wets the bed. Nothing seems to worry him. You have to come right down on him to make him do things. I have to wash his face and comb his hair. He cries easily."

Carl's mother was a tense, tearful woman of 40 years who worked as a stenographer after graduating from high school. She had always been lame, the result of an attack of infantile paralysis when she was a child. She kept her stenographic job even after she was married because she felt her husband was too independable to carry the financial responsibility for the family.

Carl's father was a talkative, superficially gay, 40 year old carpenter, who drank heavily in his youth, but who had reformed at his wife's insistence after marriage. He spent much of his time trying to invent gadgets and resented his wife's disgust at his inventions even though none of them had ever been marketed. He was an irritable, impatient man who scolded Carl some, but mostly ignored him.

Carl's birth and early development were normal except for his delayed speech. Until the age of 4 he was cared for mostly by his maternal grandmother, a warm, permissive individual who loved him devotedly. Shortly after her death his stuttering began. At the time he was first seen in the clinic he was a neat, attractive, serious, somewhat shy boy who spoke in a halting manner, blocking markedly at the beginning of each sentence. His explosive speech was accompanied by a variety of facial grimaces. In spite of his speech difficulty he cooperated well on the Binet examination, attaining a mental age of 6 years, 10 months with an I.Q. of 95. He was right-handed, right-footed and right-eyed.

Stuttering, then, began to be a problem with Carl at the age of 4, shortly after the death of his beloved grandmother. His mother, a tense, coercive woman, worked during the day and spent the little time she had with him at night in pushing and correcting him. His easily irritated, impractical father seldom saw the boy, as his work and hobbies kept him occupied far into the night. The loving support in Carl's environment was terminated by the death of his grandmother at the time he was struggling to bring his speech mechanism under control. For the preceding three years the boy had been deprived of needed affection and had been coerced and criticized, particularly in the areas of speech, schoolwork, and cleanliness.

Improvement is taking place very slowly in Carl because the parental attitudes in this case are so difficult to modify. He is being seen by P. J. Glasner, speech therapist, and a broad program of speech correction, psychotherapy and work with the boy's parents is being followed.

ROBERT C., a 10-year, 3-month old boy, was brought to the clinic by his mother because of stuttering, obesity, and enuresis. His mother, an obese, restless woman, gave this story.

"It's his nerves I guess that cause the defect in his speech. He has had this since he was about 3 years old. He screws up his mouth to the side and he can't get the words out He wets the bed. He is overweight. The doctor put him on a diet, but it's so hard to put a child on a diet.

"He is a very good child, and jolly. When he was little the other boys did pick on him, but I always stepped in and tried to find out why. When he was 3 years old I went to the

at hand, there is no reason to attribute distinctive significance to fluorine effect among the children included in these studies. If it were true that initial caries resistance was due to fluorine ingestion, one would expect a low caries incidence among the younger subjects and those who had recently come from areas of possible fluorine supply. The data indicate, on the contrary, that these differences were not apparent, but rather that the longer the subjects remained in the institutions, the less rapidly their caries tended to progress.

TABLE VIII. INCIDENCE OF CARIES OF PERMANENT TEETH AS RELATED TO PRESENCE OR ABSENCE OF HYPOPLASTIC ("MOTTLED") ENAMEL

AGE	1. WITH ENAMEL HYPOPLASIA			2. WITHOUT ENAMEL HYPOPLASIA			DIFFERENCE OF MEANS (2-1)	STANDARD ERROR OF DIFFERENCE	RATIO DIFF./STANDARD ERROR OF DIFFERENCE
	NO. SUBJECTS	DMF* SURFACES		NO. SUBJECTS	DMF* SURFACES				
		MEAN	STANDARD DEVIATION		MEAN	STANDARD DEVIATION			
Children from Institution 6									
6 to 9 years	13	*3.9*	3.3	21	*3.6*	2.3	-0.3	1.0	0.33
10 to 13 years	34	*7.15*	3.6	37	*5.8*	4.1	-1.35	0.9	1.5
14 to 19 years	47	*10.2*	9.1	72	*11.2*	7.0	+1.0	1.47	0.68
Children from Institutions 1 to 5 Inclusive†									
14 to 19 years	77	*11.1*	7.8	146	*14.0*	9.25	+2.9	1.17	2.48

*DMF implies decayed, missing or filled; each extracted tooth is considered to have had three carious surfaces.

†Data taken from previous publication.[3]

DISCUSSION

These epidemiologic studies of caries are based on comparisons between certain indices relating to tooth decay in contrasted child populations. For such comparisons to have validity, it is necessary that the data be collected under similar conditions. Other studies regarding the constancy of dental findings have demonstrated that widely different values may be obtained by successive observers for the same population, or even for the same mouth.[5] To eliminate the human equation as much as possible, it is best that all examinations subject to comparison be made by the same individual under rigid standard conditions. If more than one examiner must be used, every effort should be made to assure similarity of appraisal and of methodology. The ideal dental examination should be unhurried. It should provide for initial operative cleansing of the teeth, and the drying of each exposed tooth surface prior to its detailed examination by means of sharp explorers and mouth mirror with adequate illumination. Accounting should be made for each tooth space. The clinical findings should be verified or extended by means of complete dental roentgenograms. The record should indicate the site, extent, and present activity or softness of each dental lesion, compiled with a statement as to evidences of earlier treatment. Also, there should be included statements concerning the status and apparent health of the supporting tissues, taking into account the degree of cleanliness and evident care of the mouth.

The current study approximated the stated ideals as well as circumstances would permit. It was not possible to clean the teeth as a preliminary measure,

of the adults surrounding his patient, and direct his therapeutic efforts to them. For his older children he will inquire into the methods of the near-by speech instructors, to see if they have the training and understanding to be competent psychotherapists as well as speech technicians. He will realize that a therapeutic program which is not individualized or which does not attempt to understand the child's emotional difficulties makes the child more conscious than ever of his defective speech and does him more harm than good.

REFERENCES

1. Van Riper, Charles: The Nature of Stuttering, Dept. of Speech, Western State Teachers College.
2. Bluemel, C. S.: Stammering and Allied Disorders, New York, 1935, The Macmillan Company.
3. Swift, W. B.: Visualization Is the Best Method for Stammering, Proc. Am. Soc. Study Disorders Speech, 1930, p. 83.
4. Travis, L. E.: Speech Pathology, New York, 1931, D. Appleton-Century Company, Inc.
5. Johnson, Wendell: The Indians Have No Word for It: I. Stuttering in Children, Quarterly J. Speech 30: 330, 1945.
6. Bullen, A. K.: A Cross-Cultural Approach to the Problem of Stuttering, Child Development 16: 1, 1945.
7. Despert, J. Louise: A Therapeutic Approach to the Problem of Stuttering in Children, Nervous Child 2: 2, 1943.
8. Johnson, Wendell: A Study of the Onset and Development of Stuttering. Speech Disorders 7: 251, 1942.
9. Davis, Dorothy M.: The Relation of Repetitions of the Speech of Young Children to Certain Measures of Language Maturity and Situational Factors, J. Speech Disorders 4: 308, 1939.
10. Despert, J. Louise: Psychosomatic Study of Fifty Stuttering Children, Am. J. Orthopsychiatry 16: 100, 1946.
11. Kopp, Helene: Ozeretzky Tests, Am. Orthopsychiatry 16: 114, 1946.
12. West, Robert: The Pathology of Stuttering, The Nervous Child 2: 96, 1943.
13. Karlin, I. W., and Kennedy, L.: Stuttering—Problem and Suggested Treatment, Am. J. Dis. Child. 55: 383, 1938.

TABLE IX. INCIDENCE OF CARIES OF PERMANENT TEETH FOR INSTITUTION SUBJECTS COMPARED WITH VALUES FROM THE HAGERSTOWN PUBLIC SCHOOL POPULATION

AGE	6	7	8	9	10	11	12	13	14	15	16	17	18	19
DMF* surfaces for each child; mean:														
Institution subjects (with $M = 3$)*	1.9	2.5	3.9	4.8	6.8	5.4	6.6	7.4	10.5	11.0	10.7	13.0	13.4	15.4
Hagerstown subjects (with $M = 3$)*	0.4	1.0	1.6	3.5	4.4	4.7	8.1	7.5	9.6	11.5	12.7	13.9	16.3	19.0
(with $M = 5$)	0.6	1.0	1.7	3.8	4.9	5.2	7.2	8.9	10.9	13.3	14.7	16.4	19.8	24.6
Average number of extracted permanent teeth per capita:														
Institution subjects			0.03			0.075					0.5			
Hagerstown subjects			0.057			0.35					1.0			
Incidence of untreated caries (per cent of cavities unfilled):														
Institution subjects			96			73					73			
Hagerstown subjects			62			47					30			

*DMF implies decayed, missing or filled; each extracted tooth is considered to have had three or five carious surfaces prior to extraction, as indicated in the table.

fissures, and with no apparent dentinal involvement. Nevertheless, such areas were included among the score of affected surfaces if there was any question as to the presence of enamel caries. Moreover, the exposed dentin in many open cavities was flintlike in consistency, giving the impression that caries had become arrested. The incidence of extracted teeth was low, and some extractions obviously had been made not because of caries but because of periodontal disease in mouths where little or no caries was evident. Other teeth evidently had been extracted as a simple means of relieving the patient's discomfort, without an attempt to conserve the tooth. The general status of the whole population, therefore, made it more justifiable to score extracted teeth on the assumption that an average of three rather than five surfaces had been affected by decay. If our interests in this study were directed toward tooth mortality rather than toward caries, we would consider that the extraction of a posterior tooth necessarily led to the loss of five exposed surfaces. Since instead we are concerned primarily with the measurement of the extent of decay, it seems inexact to employ any arbitrary coefficient as a measure of the pre-extractive extent of caries in a given tooth; instead, it would be better in each instance to base the estimate on the collateral extent of decay in the remaining teeth. To avoid individualization we have accepted an average of three affected surfaces for each extracted tooth; with consideration of the general dental status of the entire population included in our survey, this seems to be a conservative estimate. Work now in progress tends to substantiate this concept.[6]

One may assume that the general status of the mouths of the Hagerstown children led the investigators to assign the value of five affected surfaces to each extracted tooth among those children. If such an assumption be correct, then it is proper to compare the present data, based on a coefficient of three affected surfaces, with the Hagerstown data in which the coefficient is five. The validity of such an assumption is open to question. When corresponding coefficients are employed for the two contrasted groups, the most striking differences be-

Because of this inequality of age and number of subjects in the different institutions, the data in some of the tables accompanying this report have been limited to certain groups of subjects; in other tables the data for certain subgroups have been pooled so as to form homogeneous groups appropriate as to age and number for the analysis under consideration. In no instance has such limitation or pooling of subjects led to perversion of the general trends of the data. Statistically considered, the greatest reliability of data lies in the groups from the state institutions, particularly among those from 14 to 19 years of age.

PRESENTATION OF DATA

The incidence of caries in permanent teeth has been summarized in Tables II to V inclusive. For each subgroup studied, the data include the mean or median value for caries incidence, the total range of observed values, and the range for the middle one-half of the subjects. As a measure of caries extent we have used the number of surfaces of permanent teeth which have shown decay in each subject's mouth. The symbol DMF is used to connote decayed, missing, or filled: each extracted tooth is considered to have had three carious surfaces prior to extraction. The basis for this assumption will be given consideration in the discussion of results.

Table II deals with all subjects in terms of age, without regard to sex, place, or duration of residence. Table III presents the data in terms of the specific custodial institution. Table IV deals with the caries scores differentiated according to sex. Table V provides correlation of caries experience with the respective duration of residence under custodial regimentation.

The median caries extent was progressively greater in each successive age group (Table II), with an increment approximating one newly affected tooth surface each year. It is worthy of comment that no acceleration of caries progression rate was evident during the postshedding years. Only the school for the feeble-minded provided sufficient numbers of subjects to permit comparison of caries incidence among its subjects for the full age range of this study. In that institution, the median caries values during the early, late, and postshedding periods (6 to 9, 10 to 13, and 14 to 19 years of age) were four, six, and eight affected tooth surfaces, respectively. Among the various institutions, the median values for affected surfaces among those 14 to 19 years old ranged from the low of eight surfaces for the feeble-minded group to fourteen surfaces for the boys from the industrial school (Table III). The median value for all subjects in that age group was ten affected surfaces.

The incidence of extracted permanent teeth was negligible among subjects who had not completed the shedding of their deciduous teeth. Among the subjects who were 14 to 19 years old, there was an average incidence of 0.5 extracted permanent teeth for each subject. When the incidence was considered in terms of the specific institution, it ranged from 0.0 to 0.73 (Table III). There was no correlation between the group incidence of extractions and the median incidence of caries.

The low incidence of filled cavities among the various groups is worthy of emphasis. The proportion of unfilled cavities to the total caries incidence ranged

clinic[1] we observed a similarly greater incidence of caries among girls than boys, but when studied in terms of posteruptive age of specific teeth, we could not relate the difference to the posteruptive age of the teeth. Instead we attributed the sex difference to the poorer habits of eating encountered in girls. This institution study permits further exploration of sex differences in caries incidence. Among these children who were living under conditions of regimentation, no sex difference in caries experience could be established. Under institutional conditions of living the boys and girls ate the same types of food, and the children were given less opportunity to choose or to reject than is common in the average home. One may properly infer from this lack of sex difference that when such differences are encountered they are due to living practices rather than to sex per se or to posteruptive tooth age. One may assume that if conditions of life are such that the trend toward caries is depressed, time will cease to be the most significant factor governing the extent of caries in the individual mouth.

Of the 14- to 19-year-old subjects living in the more populous institutions, only the boys from the industrial school (institution 2) had a median DMF value which exceeded the mean value for the corresponding Hagerstown population. One would predict this difference, if factors relating directly to custodial care were primarily concerned with the lessening of caries progress. The commonest term of residence in the industrial school was one and one-half to two years. Moreover, the average age at the time of commitment was 15½ years. The socioeconomic status of these boys prior to commitment had not been favorable. In greatest number they represent dependent, neglected, or delinquent boys, most of whom came from broken homes. Therefore, one may assume that the caries found in their teeth reflected primarily their precommitment status.

In contrast to the industrial school population, most of the inmates of institution 4 were committed during infancy. Records for that orphanage indicate that some infants are adopted soon after entering the institution, but that most of the others may be expected to remain state charges until they reach young adulthood. Often, however, such children will spend periods of months or longer in private homes, then ultimately be returned to the institution. The situation in institution 1 is similar, except that inmates are not accepted there until they are 6 years of age or older. The age at commitment for the children at the school for the feeble-minded varies widely. With minor exception, the period of commitment extends throughout life.

Current medical philosophy calls for the consideration of emotional factors as they may affect organic disease. Until there is evidence to the contrary, one cannot properly assume that prolonged emotional tension may not favor the development of caries. We have not studied specifically such interrelationship, but recognize this need for its further investigation. Under favorable conditions, one may expect lessening of certain tensions among children under custodial care. Such children have less stimulating environments than do children living in private homes, and likewise they have less personal responsibility than does the child who must carry his own initiative at home and at school. Though it

TABLE II. INCIDENCE OF CARIES OF PERMANENT TEETH IN TERMS OF AGE OF SUBJECTS

AGE	6	7	8	9	10	11	12	13	14	15	16	17	18	19	TOTAL
Number of subjects:															
Boys	4	7	9	12	16	20	48	38	50	53	43	40	26	13	379
Girls	4	6	13	8	12	15	24	30	27	27	25	21	19	9	210
Total	8	13	22	20	28	35	72	68	77	80	68	61	45	22	619
Number of subjects with no caries	5	5	1	0	0	0	5	3	3	0	1	1	1	1	25
Number of DMF* surfaces in permanent teeth:															
Median	*0.5*	*1*	*3*	*4*	*6*	*4*	*7*	*5*	*9*	*9*	*10*	*11*	*12*	*11*	
Range of middle half of values	0-4	0-5	2-6	4-5	5-8	2-7	3-9	5-9	5-11	5-14	6-15	7-20	8-17	8-24	
Total range of values	0-7	0-7	0-9	1-11	1-23	1-19	0-18	0-32	0-49	1-32	0-31	0-47	0-32	2-30	
Number of extracted permanent teeth	0	0	0	0	0	0	1	5	13	15	19	13	21	21	106

*DMF implies decayed, missing or filled; each extracted tooth is assumed to have had three carious surfaces.

This may reflect the liberal ingestion of preponderantly carbohydrate foods. In the remaining institutions the median weight and height relationships tended to be in close agreement.

SUMMARY AND CONCLUSIONS

The incidence and extent of dental caries have been measured in 619 children resident in six custodial institutions. The caries scores of individual subjects and the average scores for respective institutions have been compared, and contrasted with corresponding values reported for a general public school population at successive age levels.

Among the younger children, the institution subjects had a higher average incidence of caries than did the corresponding public school population, but during the postshedding period the average caries incidence was significantly less among the children who had lived for several years under institutional regimentation. Those who had lived longest under custodial care had the lowest median incidence of caries. No sex difference in caries extent was evident. There was no relationship between the amount of prophylactic or therapeutic dental care the children had received and their respective caries scores. The majority of the children examined had been given meager dental care, and many showed evidence of prolonged neglect of oral hygiene.

The data presented in this report support the thesis that regimentation of living conditions may of itself modify caries experience, without evident relation to intraoral environmental factors. The mechanisms which have led to reduction of caries among these children have not yet been established. However, there is no evidence that the benefit can be attributed to the ingestion of fluorine, to reparative dental services, or to oral hygiene. These children received diets high in total carbohydrate content, and prior to the recent emergency the individual consumption of sugar had been high.

It seems probable that the lessening of caries in these children may properly be attributed to the constancy of environmental patterns, the freedom from certain emotional stresses, the regularity and constancy of food intake, and the regular inclusion in the diet of certain protective foods. Analysis of the diets employed in these institutions reveals that, though they did not meet all the standards for optimum nutrition, they were better and more constantly dependable in certain regards than those ingested by the average child.

This study is one of a series of reports dealing with the dental findings among specific groups of children, each living under such environmental conditions that certain of the variables encountered in the general child population can be eliminated from consideration. The complete series is planned ultimately to offer evidence as to the role various factors may play in the epidemiology of dental caries.

The authors wish to express their appreciation of the valuable assistance received from Mrs. Matilda Meredith, Dr. Kenneth E. Wessels, and Mrs. Eleanor V. Horne in the conduct of this study.

TABLE V. INCIDENCE OF CARIES OF PERMANENT TEETH IN TERMS OF DURATION OF RESIDENCE IN INSTITUTION, FOR SUBJECTS 12 TO 19 YEARS OLD

	DURATION OF RESIDENCE								
	LESS THAN 4 YEARS			4 TO 7 YEARS			LONGER THAN 7 YEARS		
		DMF* SURFACES			DMF* SURFACES			DMF* SURFACES	
AGE	NO.	MEDIAN VALUE	MIDDLE HALF OF RANGE	NO.	MEDIAN VALUE	MIDDLE HALF OF RANGE	NO.	MEDIAN VALUE	MIDDLE HALF OF RANGE
12	33	*6*	4- 9	17	*6*	3- 9	17	*6*	3- 9
13	33	*7*	3- 8	22	*7.5*	5-10	18	*7*	4-11
14	31	*10*	3-14	33	*8*	6-12	12	*10*	4-15
15	34	*13*	6-17	21	*13*	5-18	26	*11*	5-14
16	28	*11*	7-17	13	*11.5*	7-13	13	*9*	6-11
17	29	*12*	7-24	14	*10.5*	8-18	14	*10.5*	5-20
18	18	*13*	9-23	9	*12*	11-19	12	*11.5*	6-15
19	9	*22*	15-18	5	*12*		7	*11*	

Averages for All 14 to 19 Years Old in Terms of Duration of Residence

LESS THAN 4 YEARS				4 TO 7 YEARS				LONGER THAN 7 YEARS			
NUMBER	AVERAGE AGE	NO. DMF* SURFACES	STANDARD DEVIATION	NUMBER	AVERAGE AGE	NO. DMF* SURFACES	STANDARD DEVIATION	NUMBER	AVERAGE AGE	NO. DMF* SURFACES	STANDARD DEVIATION
149	16.4	*13.6*	8.6	95	15.8	*11.6*	8.35	84	16.1	*10.6*	6.8

*DMF implies decayed, missing or filled; each extracted tooth is considered to have had three carious surfaces.

from 41 to 100 per cent in different institutions; for all subjects the average was 73 per cent. In other words, relatively few subjects had received reparative dental care.

The degree of personal attention to the teeth also was variable both for the individual and for the institution. At the time of each dental examination, the dentist scored the hygienic status of the mouth, designating it as satisfactory or unsatisfactory. Satisfactory implied that the teeth were reasonably clean and the gingival tissues were healthy; unsatisfactory connoted evidence of long-continued neglect and poor hygiene. The summated appraisal values for each of the six institutions indicated that unsatisfactory mouths prevailed at a 7 per cent level in the best rated institution, and at a 40 per cent level in the poorest. For institutions 1 to 6, the respective incidence of unsatisfactory oral hygiene was 11, 18, 7, 25, 10 and 40 per cent. These values showed no parallelism with the corresponding levels of caries (Table VI).

TABLE VI. INCIDENCE OF CARIES OF PERMANENT TEETH AS RELATED TO THE PERCENTILE INCIDENCE OF POOR MOUTH HYGIENE

INSTITUTION NUMBER	1	2	3	4	5	6
Median number of DMF* tooth surfaces:						
6 to 9 years old			2		6	4
10 to 13 years old	6		6½	7	11	6
14 to 19 years old	10	14	9	11	13	8
Percentile incidence of prolonged poor mouth hygiene	11	18	7	25	10	40

*DMF implies decayed, missing or filled; each extracted tooth is considered to have had three carious surfaces.

SYDENHAM'S CHOREA, A SYNDROME FOR DIFFERENTIAL DIAGNOSIS

B. M. KAGAN, M.D., AND B. MIRMAN, M.D.
CHICAGO, ILL.

CURRENT pediatric texts consider Sydenham's chorea to be a manifestation of rheumatic fever.[1-3] In active rheumatic fever, an increased erythrocyte sedimentation rate (ESR) is an almost constant finding, except in the presence of cardiac decompensation and in some cases of chorea. This study was planned to consider the differences, if any, between those patients with chorea having an increased erythrocyte sedimentation rate, and those patients with chorea having a normal erythrocyte sedimentation rate.

MATERIAL AND METHOD

The patients studied were all those admitted to the Michael Reese Hospital between 1934 and 1947 who had chorea and upon whom erythrocyte sedimentation rates were done. Of the total of 107 patients, eighty-eight were seen during their first episode of chorea and followed thereafter, and nineteen were seen for the first time during their second or a subsequent episode of chorea and followed thereafter. (Charts 1 and 2. One case is not listed on the charts, but is discussed below.) Erythrocyte sedimentation rates were done by the Landau technique[4] (normal established by Herzog[5]). A thorough follow-up study was made.

DATA

The patients were grouped in the following manner:

Group I. Patients studied during initial episodes of chorea
  a. with an increased ESR
  b. with a normal ESR

Group II. Subsequent episodes of chorea in patients of Group I
  a. from Group I, a.
  b. from Group I, b.

Group III. Patients not seen during first episode of chorea, but seen for the first time during subsequent choreic episodes.

Group I, a.—Patients Seen During Initial Episode of Chorea with Increased Erythrocyte Sedimentation Rate.—Of the eighty-eight patients seen during their first episode of chorea, thirty-seven (42 per cent) had erythrocyte sedimentation rates which were above normal. Of these thirty-seven, nineteen (51 per cent) had active rheumatic heart disease at the time of admission. Twelve of the remainder showed other evidences of active rheumatic fever (muscle pains, fever, arthritis, etc.) either immediately preceding or concurrent with

From the Kunstadter Laboratories for Pediatric Research and Sarah Morris Hospital of Michael Reese.

TABLE VII. CALCULATED CARIES INCREMENT RATE: AVERAGE NUMBER OF NEWLY CARIOUS TOOTH SURFACES PER ANNUM FOR EACH SUBJECT

AGE AT TIME OF EXAMINATION	AVERAGE ANNUAL INCREMENT RATE		
	ALL SUBJECTS	THOSE IN RESIDENCE 6 YEARS OR LONGER	THOSE IN RESIDENCE 9 YEARS OR LONGER
8 to 12 years	1.3	1.1	1.2
13 to 15 years	1.3	1.3	1.1
16 to 19 years	1.2	1.0	0.7

studies have been included in the earlier report.[3] Recently we have re-examined the mouths of the children from institution 6, and included *L. acidophilus* estimation as a part of the routine. These studies will be reported at a later time. In general, it may be said that the counts of *L. acidophilus* have ranged widely, with no apparent correlation between the number of organisms and the past or current state of caries advance.

The fluorine content of the domestic water supplies used by the six institutions has been determined frequently, using currently accepted methods of analysis.[4] The water from institution 6 contained 0.4 part of fluorine per million. Samples from the other institutions contained not more than a trace at any time. There is no evidence that the caries progress of the subjects could have been affected significantly through the ingestion of fluorine during the periods of custodial care. It is less easy, however, to determine whether significant amounts of fluorine may have been ingested by some of the subjects prior to the time of commitment. Water analyses made a decade ago offered the impression that significant amounts of fluorine could be found in certain wells in practically every county of the state, even though water from other wells in the same community was reported fluorine free. More recent analyses made with the currently standard techniques have shown lesser amounts of fluorine from specific sources, suggesting that the earlier values may be accepted only with caution. Fluorosis, however, is endemic in certain sections of the state. In such areas the incidence of mottled enamel is high. However, one cannot properly assume that all enamel areas presenting pitting of the yellowish-white or brownish type are evidences of fluorosis wherever they may be found; neither can the role of fluorine in the production of such areas be dismissed without proof. If one were to attribute all lesions of the type just described to fluorine ingestion during the period of enamel deposition, then, from the clinical incidence of such a hypoplastic condition, he would be forced to assume that approximately one-third of the pooled subjects from institutions 1 to 5 inclusive, and about 40 per cent of those from institution 6 had received significant amounts of fluorine for considerable periods of time prior to reaching the age of 6 years. As has been previously reported,[3] there was less caries among the subjects with so-called mottled enamel from institutions 1, 2 and 4 than among those with no mottling from the same institutions: the difference approached a significant level. Among the subjects from institution 6, on the other hand, there was no consistent or significant difference as to the mean caries incidence for those with or without so-called mottling of the enamel (Table VIII). Even though the possible protective effect from early fluorine ingestion cannot be disproved from the data

one or more recurrences. As can be seen in Chart 1, three of these recurred from among the nineteen of the thirty-seven patients who had had during the initial episode other evidences of rheumatic activity and also active rheumatic heart disease. During this first recurrence among these three patients, two again had increased sedimentation rates, other evidences of rheumatic activity, and active rheumatic heart disease, and one of the two had a second recurrence with an increased erythrocyte sedimentation rate, other evidence of rheumatic activity, and active rheumatic heart disease. One of the three patients of this group of nineteen had a first recurrence with a normal sedimentation rate, inactive heart disease, and showed no other evidence of rheumatic activity. The latter recurrence is discussed further, below.

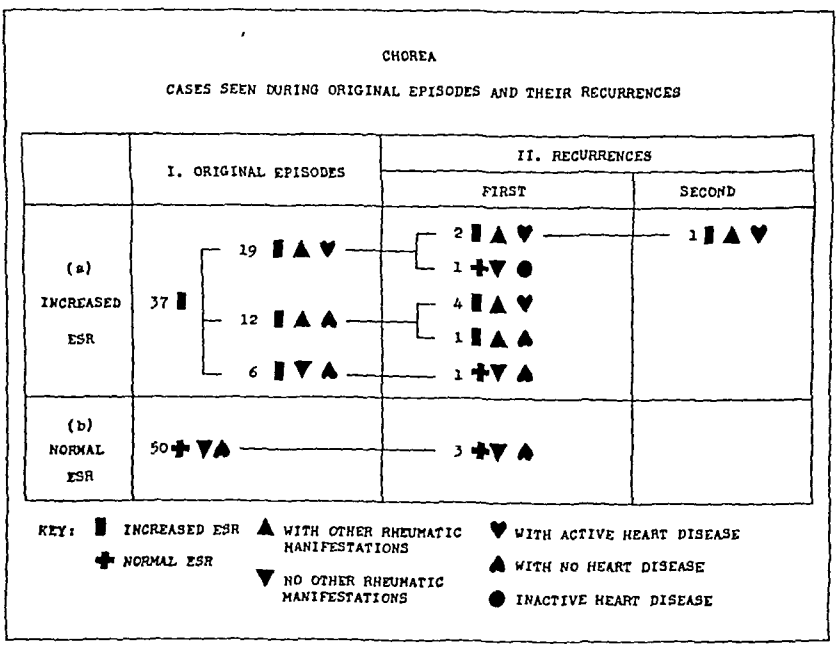


Chart 1.

Five of these recurrences were from among the twelve of the thirty-seven patients who, during their initial episode, had an increased erythrocyte sedimentation rate, other evidence of rheumatic activity, but no evidence of heart involvement. During their first recurrence, all five again had increased erythrocyte sedimentation rates and other evidences of rheumatic activity. In addition, four of these patients developed active rheumatic heart disease for the first time.

One of the recurrences was from among the six of the thirty-seven patients who, during their initial episodes, had increased sedimentation rates, no other evidence of rheumatic activity, and no heart involvement. However, this patient had a normal sedimentation rate during the first recurrence, and still had no evidence of heart involvement or rheumatic activity. It should be pointed out at this time that the sedimentation rates in the latter six patients, during

nor were the surfaces always dried prior to examination. The dental examinations in institutions 1 to 5 inclusive were all made by the same examiner, after he had been especially trained in the desired technique. Several examiners participated in the study at institution 6, but the work was well supervised and the individual examiners had been adequately trained. Roentgenograms were made part of the examination only in institution 6. The x-ray examination revealed an additional 6 per cent of presumably carious lesions, 70 per cent of which were confined to the enamel and minor in extent. On the basis of this ratio, it is unlikely that roentgen examination of the mouths of subjects from the other institutions would have changed the carious scores in significant degree

Our interpretations would be enhanced if, as a basis for comparison, we had data relating to a typical Iowa public school population, collected by our own examiners using the techniques employed for the institution subjects Such values are not now available. The values for the dental clinic clientele, reported in the first of this series,[1] are not comparable because they represent children coming specifically for dental services. Moreover, they represent preponderantly a different age group. The study of the dental clinic clientele was designed particularly to show the long-term caries course in individual subjects who were living under nonregimented conditions.

It is reasonable to believe that the data for caries incidence among the school population of Hagerstown provide a fair measure of the average caries extent one might expect to find in a typical school population where no specific regimentation of living conditions has prevailed.[2] The techniques of examination described in the reports of the Hagerstown studies apparently correspond closely with those employed in the current study. Table IX presents a comparison of the average findings for several items from the total institution population and from the Hagerstown group. To obtain similar values for comparison, it has been necessary to recalculate the published Hagerstown values so as to combine those for boys and for girls, and also for overlapping age groups in the elementary and high school populations. Moreover, in view of the fact that in the Hagerstown data a value of five affected surfaces has been assigned for each extracted tooth, in contrast to our allowance of but three, we have calculated those data in terms of each coefficient and listed both values

It will be noted that initially the institution subjects tended to have more caries than did the public school controls; but during the postshedding years this trend was reversed. Instead of showing progressive acceleration of the rate of caries as did the Hagerstown subjects, the rate tended to decelerate among those who had spent considerable intervals under custodial care. This difference will be further emphasized if reference is made to the values given in Table VI for the postshedding groups with different duration of residence.

Undoubtedly, the difference between the contrasted child populations are greater than the data indicate. The DMF scores exaggerated the amount of tooth destruction actually present among these institution subjects, because the cavities as a whole were minimal in extent, frequently limited to pits and

As can be seen in Chart II, eight of these ten patients had one recurrence during which each had an increased sedimentation rate as well as other evidence of rheumatic activity. Seven of these eight patients had, in addition to the other signs of activity, active rheumatic heart disease, and one still had no heart involvement.

Two of these ten patients who gave a history of other signs of rheumatic activity during their first episode of chorea had, during their first recurrence, normal sedimentation rates and evidence of inactive rheumatic heart disease. These recurrences are discussed below. Of these two patients, one had a second recurrence, this time with an increased erythrocyte sedimentation rate, other evidence of rheumatic activity, and active rheumatic heart disease.

Group III, b. Patients with History of Previous Episode of Chorea Without Other Evidence of Rheumatic Infection.—Of the nineteen patients who were not studied during their first episodes of chorea, nine gave no history of other rheumatic activity at any time. Again referring to Chart 2, it can be seen that these nine patients were seen for the first time during their first or during a subsequent recurrence. There was no history of any other evidence of rheumatic fever during the previous episodes of chorea in any of these cases. All had normal erythrocyte sedimentation rates and none showed other evidence of rheumatic activity or of heart involvement during these recurrences. Five patients were seen for the first time during their first recurrence, and of these, two had a second recurrence. One patient was seen for the first time during his second recurrence; another for the first time during his third recurrence (this child subsequently had a fourth recurrence); one was seen first during his fourth recurrence, not during his fifth recurrence but again during his sixth recurrence; and one was seen for the first time during his sixth recurrence. All had sedimentation rates which were normal, and none showed other evidence of rheumatic activity or heart involvement at any time.

Briefly, these nine patients gave a history of a total of twenty previous episodes of chorea with no other evidence of rheumatic activity. They had a total of thirteen recurrences which were studied. Each time the sedimentation rates were normal and none showed evidence of heart disease at any time nor any other sign of rheumatic activity.

ANALYSIS OF DATA

It is quite clear from the above that chorea associated with an increased erythrocyte sedimentation rate is in most instances a manifestation of active rheumatic fever. Eighty-four per cent of patients with chorea and an increased sedimentation rate showed other evidence of rheumatic activity, and 62 per cent of these eventually developed rheumatic heart disease. It is equally clear that patients who have a normal erythrocyte sedimentation rate during their first episode of chorea do not have rheumatic fever and are no more subject to its sequelae than are other members of the population.

In the cases of nonrheumatic chorea it was shown that psychogenic factors were far more numerous and varied than in the cases of rheumatic chorea.

tween the two sets of values are the initially greater incidence among the institution subjects, and the reverse situation among those in the middle and late teen years. It is among these older subjects that the ones with the longest periods of institutional residence are included, so it seems reasonable to attribute their lessened caries scores to some factor associated with their institution life.

The Hagerstown children as a group offered evidence of more professional dental care than did the institution populations. The nature and amount of such care in our subjects differed, however, from one institution to another. For example, in institution 4 the children received frequent and excellent medical and dental supervision. Hygienic dental measures were employed routinely and major cavities were filled promptly. The children were trained to brush their teeth regularly and thoroughly, and facilities were provided for the purpose. In institutions 1 and 2 conditions were somewhat similar, but dental services were more limited. In institution 6, facilities for dental care were inconstant and inadequate. We have no data for the entire population from institution 6 because in our survey only those subjects were included who were able to cooperate sufficiently to permit the performance of an adequate dental examination. Of the subjects examined, few had received professional dental care other than the removal of offending teeth. The routine of tooth-brushing was practiced among these children, but with widely variable efficacy due to the limited capacity of the subjects to participate actively.

From the preponderance of unfilled cavities among the total institution population, one must conclude that the lack of dental treatment had not of itself led to the noteworthy furtherance of caries. In fact, this lack of dental care may tend to lessen the apparent incidence of decay. This paradox is understandable if one realizes that any filling of necessity must be larger than the area of caries it is designed to replace. Furthermore, in child populations where pits and fissures of the enamel are filled routinely as a prophylactic measure designed to prevent the development of decay in such regions, one cannot know whether such areas would have become carious if the prophylactic fillings had not been placed. Contrary to prevailing dental philosophy[7] one need not assume that all deep pits or fissures will lead to caries. In populations where conditions tend to retard caries, such supposedly susceptible areas may remain noncarious until they have become obliterated through attritional wear.

Even though lack of dental care has not led to notable caries advance among these subjects, lack of recurrent dental care is not to be condoned. Both the studies of the Hagerstown children[2] and of our dental clinic clientele[1] make it evident that whereas professional dental care does not prevent the development of new carious lesions, it does serve to check its local advance and lessen tooth mortality.

Among the Hagerstown subjects the girls had a higher incidence of caries in terms of age than did the boys. This was attributed to the fact that girls tend to erupt their permanent teeth at an earlier age than do boys, and as a consequence, at any given age the teeth of girls have been exposed to caries-producing influences for a longer interval of time. In the clientele of the dental

and for them, happier surroundings of the hospital. These recurrences, therefore, may be imitative, this time in imitation of a previous rheumatic chorea in the same patient. It is our concept that if chorea can be imitative, it is not so on a conscious level any more than are tics.

There remains for analysis the six patients (Group I a, Chart 1), who had chorea with an increased sedimentation rate and no other evidence of rheumatic fever. One of these had a recurrence with a normal sedimentation rate and no other evidence of rheumatic infection. Two of these patients had sedimentation rates of 25 and 30, but in four the sedimentation rates were only 2 mm. above the accepted upper limit of normal. It is quite possible therefore, that the basis for chorea in the latter four patients at least was also nonrheumatic, and that the cause of the slightly elevated sedimentation rates was something other than rheumatic fever. There is insufficient data to evaluate these particular cases as either rheumatic, psychogenic, or of other cause.

RE-EVALUATION OF THE LITERATURE

The evidence for the concept of a rheumatic and a nonrheumatic chorea given above is so clear and of such great importance that it was considered necessary and reasonable to expect that the abundance of data collected by previous workers in this field over the past years should either support or deny it. That this concept is supported by the data of previous workers, if not by their analysis, is shown below.

In our series of 107 patients with chorea, forty-one (38 per cent) (thirty-one from Chart 1 and ten from Chart 2) had other manifestations of rheumatic infection. The percentage of patients with chorea who have shown other rheumatic manifestations has varied somewhat in the numerous studies which have been made. This is due in large part to the different manner in which the statistical data was organized in each study and to the criteria used by various investigators for the diagnosis of rheumatic fever. Nevertheless, in fourteen of the following twenty studies the percentage of other rheumatic manifestations in patients with chorea was below 50 per cent, yet almost all of these investigators concluded from this that chorea along with rheumatic arthritis is merely another manifestation of rheumatic fever. More striking, perhaps is the fact that of the 6,543 cases which these studies represent only 33 per cent showed other manifestations of rheumatic fever.

Thus Johnston[7] found other evidence of rheumatic fever in only 41 per cent of his seventy-one patients with chorea (leaving 59 per cent without other evidence of rheumatic infection); Gibson[8] found other evidence of rheumatic fever in 56 per cent of his 581 patients with chorea (leaving 44 per cent without other evidence of rheumatic infection); Sutton and Dodge[9] in 52 per cent of their 466 choreic patients (leaving 48 per cent without); Coburn and Moore[10] in 49.7 per cent of their 137 hospitalized choreic patients (50.3 per cent without); Parrish and associates[11] in 30.3 per cent of 112 patients (69.7 per cent without); Gerstley, Wile, and Falstein[12] in 13.3 per cent of 150 patients (86.7 per cent without); Schwarz and Leader[13] in 10.7 per cent of eight-four patients (89.3 per

is recognized that the atmosphere even in a well-managed custodial institution fails to personalize a child and tends to dwarf his capacity for self-expression, yet it avoids some of the emotional tensions which characterize home life: it is noncompetitive and predictable. Emotional tension and a sense of personal insecurity were present among the boys in the industrial school: these traits were least notable among the children in the institution for the feeble-minded. The mentally retarded child usually accepts the environment and protection offered by a good institution, and frequently is much happier there than he would be living in the average private home where he would be brought into competition with his more capable associates.

An attempt was made to determine the characteristics of the diet in the four state-controlled institutions.[8] A worker specially trained in dietetics visited each institution, where she observed eating practices, collected menus employed during considerable periods of time, studied the over-all consumption of key foodstuffs from records of purchase and production, and calculated the apparent adequacy of intake of specific nutrients. Some aspects of that study have proved contradictory, and others are difficult to interpret. It was not uniformly possible to distinguish between foods eaten by inmates and those eaten exclusively by the employed personnel. One cannot make sure that conditions as they were observed were typical of those which prevailed at other times. Certain conclusions, however, may be deduced. There was little variation from child to child in a respective institution as to the type of food each received. Children were trained and expected to eat the food served without waste. Each child ate three meals daily. Milk was supplied in fair abundance; in some instances it even comprised a disproportionate amount of the protein supply. Vegetables and fruits probably were offered in adequate amount, even though the variety might be slight. No child was deprived of an ample supply of calorific foods. A high proportion of the calories was derived from carbohydrate sources. Sugar consumption during the prerationing days had not been restricted. From an analysis of the total amount consumed semiannually, it was estimated that the daily per capita consumption ranged from 2 oz. in institution 2 to almost 4 oz. in the other institutions. One would not classify the diets as optimum, yet, because of their constancy and their universal consumption alone they probably were superior to those eaten by many Iowa children living in private homes.[9] Because of the findings in earlier reported studies[10] the authors are inclined to attribute the lessened caries experience among these regimented children principally to factors associated with their intake and utilization of food.

As a gross means of appraising the over-all nutritional status, the height and weight of each child were measured at the time of the dental examination. The measurements have been compared with standards for Iowa children from middle-class homes.[11] The observed values were classified in relation to the degree in which each deviated above or below the standard median or mean. It then was possible to compare the degree of deviation for weight in terms of age with the corresponding deviation of height for age. Using this procedure it was found that in institutions 1 and 2 the weight tended to be about one standard deviation greater than would have been predicted from the corresponding height.

childhood, and that rheumatic fever is a cause of heart disease, let alone that chorea is often associated with rheumatic fever. As a pioneer and keen observer, Roger undertook to prove all of these relationships at once. In doing so, however, he reported eighty-seven patients[30] in his papers on chorea, all of which had rheumatic fever and most of which, but not all, had chorea. He did not know the total number of patients[31] from which he had selected these cases over a ten-year period, and he was not concerned with choreic patients who might not have rheumatic fever. He is therefore justly credited with proving the existence of an association between rheumatic fever and chorea; unfortunately, however, his convincing presentation led most subsequent observers to overlook the relatively large number of choreic patients who do not have rheumatic fever.

Only a few, such as Sturges,[32] called attention to the large group in which this association was not clear. During the years which followed the reports of Roger, Sturges[33] (1883), Hughes[34] (1846 and 1855), Gowers[35] (1898), Smith[36] (1886), and Sachs[37] (1905) still considered fright and other psychic factors to be very important, and they expressed dissatisfaction with the idea that rheumatic fever is the principal or sole cause of chorea. Nevertheless, prominent men such as Still[38] regarded chorea to be "just as good evidence of rheumatism as a gumma is of syphilis"

DISCUSSION AND CONCLUSION

From our data and from the above re-evaluation of the literature the following was concluded. Chorea associated with an increased erythrocyte sedimentation rate is in most instances a manifestation of active rheumatic fever. Patients, on the other hand, who have their first episode of chorea with a normal sedimentation rate (in the absence of cardiac failure) do not have rheumatic fever and are no more subject to its sequelae than are other members of the population. The subsequent incidence of rheumatic disease in these patients may be expected to be similar to that of the general child population.*

The etiology of nonrheumatic chorea is not established. The data of some of the earlier investigators, the seriousness of the psychic traumata and their temporal relationship to the onset of chorea in our nonrheumatic choreic patients in this series, and the fact that obvious emotional disturbances were more varied in character and more than twice as common in the nonrheumatic

*In this connection, the incidence of rheumatic fever in the child population is of importance. Since it is not a generally reported disease, adequate statistics are not available. In a recent study by Quinn,[39] the incidence was estimated by adding together those patients with mitral disease and those patients with "potential heart disease" and a history of rheumatic fever. From his study of 401 school children in Georgia, he thus estimated an incidence of two cases of rheumatic fever per 100 children. Of 442,763 school children examined in Chicago,[40] 6,011 were found to have organic heart disease. Eighty per cent of organic heart disease in this age group is considered by Paul and associates[41] to be due to rheumatic fever On this basis, 4,809 children of th[illegible] heart disease Inasmuch as more patients [illegible] tha[illegible] disease, the incidence of rheumatic fever in [illegible] be[illegible] to be more than 1 per cent Thus, one woul[illegible] ong 100 nonrheumatic choreic patients at least one who might later dev[illegible] or who at one time had rheumatic fever with no chorea It is this high incidence of rheumatic fever in the child population that most probably explains the one patient in this study who had a history of rheumatic fever with heart involvement but with no chorea, and who, after a free interval of four years, had one episode of chorea with a normal sedimentation rate During this episode of chorea he had no clinical evidence of either active or inactive heart disease and no other evidence of rheumatic activity (This case is not included on the charts)

REFERENCES

1. Boyd, J. D., and Cheyne, V. D.: Epidemiologic Studies in Dental Caries: I. The Pattern of Dental Caries in Iowa City Children, J. PEDIAT. 29: 157, 1946.
2. Klein, H., Palmer, C. E., and Knutson, J. W.: Dental Status and Dental Needs of Elementary School Children. Pub. Health Rep. 53: 751, 1938.
   Klein, H., and Palmer, C. E.: The Prevalence and Incidence of Dental Caries Experience, Dental Care and Carious Defects Requiring Treatment in High School Children, Pub. Health Rep. 55: 1258, 1940.
3. Boyd, J. D., and Cheyne, V. D.: To What Extent Does Fluorine Ingestion Lessen Tooth Decay? J. PEDIAT. 29: 286, 1946.
4. Iowa State Planning Board: Mineral Analyses of the Underground Waters of Iowa, State Printing Board, 1938; also additional unpublished analyses from the State Water Laboratories.
5. Deatherage, C. F., Wilson, L. A., and Ledgewood, R.: Variability of Routine Diagnoses of Dental Defects in Children of School Age. J. Am. Dent. A. 26: 1739, 1939.
   Radusch, D. F.: Variability of Diagnoses of Incidence of Dental Caries, J. Am. Dent. A. 28: 1939, 1941.
6. Wessels, K. E., and Cheyne, V. D.: Unpublished data.
7. Hyatt, T. P.: Dental Cosmos 65: 234, 1923.
8. Boyd, J. D., and Scott, Louise A.: Unpublished data.
9. Boyd, J. D.: The Need for Betterment of Children's Diets, J. Am. Dietet. A. 20: 147, 1944.
   Idem: Prescribed Diets for Normal Children, J. PEDIAT. 24: 616, 1944.
10. Boyd, J. D.: Prevention of Dental Caries in Late Childhood and Adolescence, J. Am. Dent. A. 30: 670, 1943; Dietary Control of Enamel Caries, Ibid. 30: 1344, 1943.
    Idem: Long-Term Prevention of Dental Caries Among Diabetic Children, Am. J. Dis. Child. 66: 349, 1943.
11. Jackson, R. L., and Kelly, H. G.: Growth Charts for Use in Pediatric Practice, J. PEDIAT. 27: 215, 1945.

16. Poynton, F. J., Patterson, D., and Spence, J. C.: Acute Rheumatism in Children, Lancet 2: 1086, 1920.
17. Abt, I., and Levinson, A.: A Study of 226 Cases of Chorea, J. A. M. A. 61: 1342, 1916.
18. Helmholtz, H. F.: J. A. M. A. 61: 1342, 1916.
19. Starr, M. A.: Organic and Functional Nervous Diseases, ed. 4, Philadelphia, 1913, Lea & Febiger, p. 778.
20. Thayer, W. S.: An Analysis of 808 Cases of Chorea, with Special Reference to Cardiovascular Manifestations, J. A. M. A. 47: 1352, 1906.
21. Batten, F. E.: The Occurrence of Rheumatism in Children Subsequent to an Attack of Chorea, Lancet 2: 1195, 1898.
22. Holt, L. E.: Diseases of Infancy and Childhood, New York, 1897, D. Appleton Century Company, p. 674.
23. Sachs, B.: Keating's Encyclopedia of Diseases of Childhood, Vol. IV, Philadelphia, 1890, J. B. Lippincott, p. 842.
24. Osler, W.: The Cardiac Relations of Chorea, Am. J. M. Sc. 188: 371, 1887.
25. MacKenzie, S.: Report on Inquiry Nr. II, Chorea, Brit. M. J., p. 26, 1887.
26. West, C.: Lectures on Diseases of Infancy and Childhood, London, 1874, Longmans, Green and Company, p. 226.
27. Rufz, M.: Recherches sur quelques Points de l'Histoire de la Chorée chez les Enfants, Arch. Gen. de Med. II Serie, 4: 215, 1834.
28. Stoll, M.: (a) Pars Tertia Rationis Medendi, Vienna, Austria. Vols. III-IV; Obs. 7, p. 414, Obs. 8, p. 416, 1780-89. (b) Pars Septima Rationis Medendi, Vienna, Austria. 7: 6, 1790.
29. (a) Roger, H.: Recherches Cliniques sur la Chorée, sur la Rhumatisme et sur les Maladies du Coeur chez les Enfants. V Prem. Partie: Du Rhumatisme Articulaire et Visceral chez les Enfants, et Specialement de leur Rapports avec la Chorée. Arch. Gen. de Med. Vol. VIII: 8 iem Serie, pp. 641-665. 1866. (b) Recherches Cliniques sur le Rhumatisme et sur les Maladies du Coeur chez les Enfants. Arch. Gen. de Med. Vol. IX: 6 iem Serie, pp. 54-75, 1867. (c) Recherches Cliniques sur la Chorée, sur la Rhumatisme et sur les Maladies du Coeur chez les Enfants, et Specialement du leurs Rapports avec le Chorée (Chorée Cardiaque). Arch. Gen. de Med. Vol. XI: 6 iem Serie, pp. 26-42, 148-178, 288-305, 393-421, 1868.
30. See (29, c), p. 409.
31. See (29, c), p. 36.
32. Sturges, O.: School Work and Discipline as a Factor in Chorea, Lancet 1: 9, 1885.
33. Sturges, O.: The Rheumatic Origin of Chorea, Lancet 2: 808, 1883.
34. Hughes, H. M.: (a) See (6), pp. 360-395. (b) Hughes, H. M., and Brown, E. B.: Digest of 209 Additional Cases of Chorea, Guy's Hosp. Rep., London 1: 3. 217, 1855.
35. Gowers, W. R.: A Manual of Diseases of the Nervous System, ed. 2, Philadelphia, 1898, P. Blakiston's Son and Company. Part V, pp. 592-628.
36. Smith, J. Lewis: Diseases of Infancy and Childhood, ed. 6, Diseases of the Cerebrospinal System, Philadelphia, 1886, Lea & Febiger, Chap. XIV, Part III, Sect. I, pp. 512-528.
37. Sachs, B.: A Treatise of Nervous Diseases of Children, ed. 2, New York, 1905, Wm. Wood, pp. 108-128.
38. Still, G. F.: Common Disorders of Diseases of Childhood, ed. 3, London, 1920, American Branch of the Oxford University Press, pp. 514-532.
39. Quinn, R. W.: The Incidence of Rheumatic Fever and Heart Disease in School Children in Dublin, Georgia, with some Epidemiological and Sociological Observations, Am. Heart J. 32: 234, 1946.
40. Bull. Chicago Heart Association 5: 8, 1927.
41. Paul, J. R., Harrison, E. R., Salinger, R., and DeForest, C. K.: The Social Incidence of Rheumatic Heart Disease, Am. J. M. Sc. 188: 303, 1934.

the chorea; six showed no other evidence suggestive of rheumatic fever except the increased sedimentation rate. Thus, of thirty-seven patients experiencing a first episode of chorea accompanied by an increased erythrocyte sedimentation rate, thirty-one (84 per cent) showed other evidence of rheumatic activity at that time.

Of the eighteen patients who did not have heart involvement during the first episode of chorea, four developed it subsequently. All four were from among those twelve patients who had had other rheumatic manifestations during the first episode of chorea. None of the six patients who had had no other suggestive evidence of rheumatic fever developed heart involvement subsequently. The latter six patients are discussed below. Thus, twenty-three of the thirty-seven patients (62 per cent) with chorea and an increased sedimentation rate eventually developed rheumatic heart disease. Of these thirty-seven patients, five were followed for six months, nine for from one to four years, and twelve for from four to twelve years.

Emotional disturbances, such as irritability, crying easily, talkativeness, and disobedience were noted in eleven (30 per cent) of these thirty-seven patients.

Group I, b.—Patients Seen During Initial Episode of Chorea with Normal Erythrocyte Sedimentation Rate.—Of the eighty-eight patients seen during their first episode of chorea, fifty-one (58 per cent) had normal erythrocyte sedimentation rates. Not one of these showed any other evidence of active rheumatic fever during these admissions; only one gave a history of rheumatic fever. (The latter is not shown on the chart but is discussed below.) Fifteen were followed for five to eleven years thereafter, and fourteen for between one and five years, and none of these developed rheumatic fever subsequently at any time.

In this group, psychic factors far outweighed in number and character those noted in the cases of Group I, a. The more common of the obvious psychic disturbances in this group were irritability; crying easily; being temperamental, disobedient, stubborn, selfish, cross, impulsive; having temper tantrums, feelings of inferiority at school; stealing; loss of interest in school; excitability; and fearfulness. Such symptoms were noted in thirty-three of these fifty-one patients (65 per cent).

Two patients in this group developed their first episode of chorea following a severe fright, one following and accompanied by a profound emotional reaction set off by a change to a new and more stringent teacher, two following a first menstrual period for which they were mentally unprepared, and one occurring in an emotionally distraught girl whose most intimate playmate had just recovered from chorea. Such striking associations were not noted in any of the cases of chorea which had an increased erythrocyte sedimentation rate (Group I, a above).

Group II, a.—Subsequent Episodes of Chorea in Patients from Group I, a.—Of the thirty-seven patients who were seen during their first episode of chorea and who at that time had increased sedimentation rates, nine (24 per cent) had

This intradermal test was done in duplicate on mothers and their premature newborns, as soon after birth as possible. A number of the premature infants had tests at intervals during their entire stay in the hospital. During this time they were receiving various amounts of ascorbic acid. All of these premature infants received evaporated milk formulas. They also were given concentrated cod-liver oil and vitamin B complex.

RESULTS

The intradermal test for vitamin C was done on thirty premature newborn infants and their mothers. The first test was done as early as possible, within a few hours to one week after birth. The results are found in Table I.

TABLE I. THE FIRST INTRADERMAL TEST FOR VITAMIN C IN PREMATURE NEWBORN INFANTS AND THEIR MOTHERS

NO.	RACE	SEX	MONTH OF GESTATION	BIRTH WEIGHT (KG.)	INFANT'S AGE (DAYS)	TEST TIME (MIN.)	MOTHER AGE (YR.)		TEST TIME (MIN.)
1	N	F	8½	2.27	5	4.8	19		18.0
2	W	M	8½	2.44	2	6.6	23		15.9
3	W	M	7	1.79	0	5.1	22		15.3
4	W	M	7	1.30	3	3.6	19		14.4
5	N	M	8	2.25	5*	4.5	26		13.8
6	W	F	8	1.62	5	5.2	29		13.4
7	W	F	7	1.25	1	4.9	23		12.9
8	W	F	7	2.35	1	3.4	33		12.9
9	W	F	7	1.72	1	4.9	28		12.6
10	W	M	7	1.52	1	3.5	22	twins	12.2
11	W	M	7	1.13	1	6.6	22	twins	12.2
12	W	M	7	2.01	1	3.3	26		11.8
13	W	M	8½	2.18	4	4.7	26		11.1
14	N	F	8½	2.27	0	4.0	34		11.0
15	N	F	7	1.77	5	4.9	21		9.9
16	N	F	8	2.50	1	5.5	33		9.6
17	W	F	7	1.76	2	4.8	23		8.9
18	W	F	8	2.10	3	5.0	19		8.5
19	W	F	7	1.10	6	3.7	28		8.4
20	N	F	8	2.10	3	4.2	37		8.2
21	N	F	7½	1.84	1	3.6	16		8.1
22	N	M	7	2.07	1	2.6	22		7.9
23	W	F	8	1.96	0	9.5	38		7.5
24	W	F	8	2.31	0	7.0	28	twins	7.0
25	W	F	8	1.96	0	6.6	28	twins	7.0
26	W	M	8	2.16	1	4.3	18		5.9
27	W	F	7	1.90	2	4.9	35		5.6
28	W	F	8½	2.01	5*	4.3	28		5.6
29	W	M	6½	1.30	7	3.3	—		—
30	N	F	7	2.13	6	6.1	—		—

*50 mg. vitamin C daily.

The intradermal test times for disappearance of the dye were shorter in the premature newborn infant than in the mother except in one instance. The average intradermal test time for the premature newborn infants was 4.9 minutes, and for their mothers 9.1 minutes. The weight of the infant had no relationship to the test time.

Ten of the premature newborn infants were followed for about eight weeks after birth. Each baby was given from 25 to 100 mg. of ascorbic acid daily. An intradermal skin test for vitamin C was done weekly. The weights were taken every other day.

their initial episode, were only slightly above the accepted normal (range 20 to 30, average 22, as compared with the other thirty-one cases in this group of thirty-seven, range 20 to 55, average 29). This group is discussed further below.

Group II, b.—Subsequent Episodes of Chorea in Patients from Group I, b.—Of the fifty-one patients who were seen during their first episode of chorea and who at that time had normal sedimentation rates and no other evidence of rheumatic fever, three (6 per cent) had a recurrence. As can be seen in Chart 1, each of these three patients had one recurrence. Again the sedimentation rates were all normal, and there was no other evidence of rheumatic activity and no sign of heart disease.

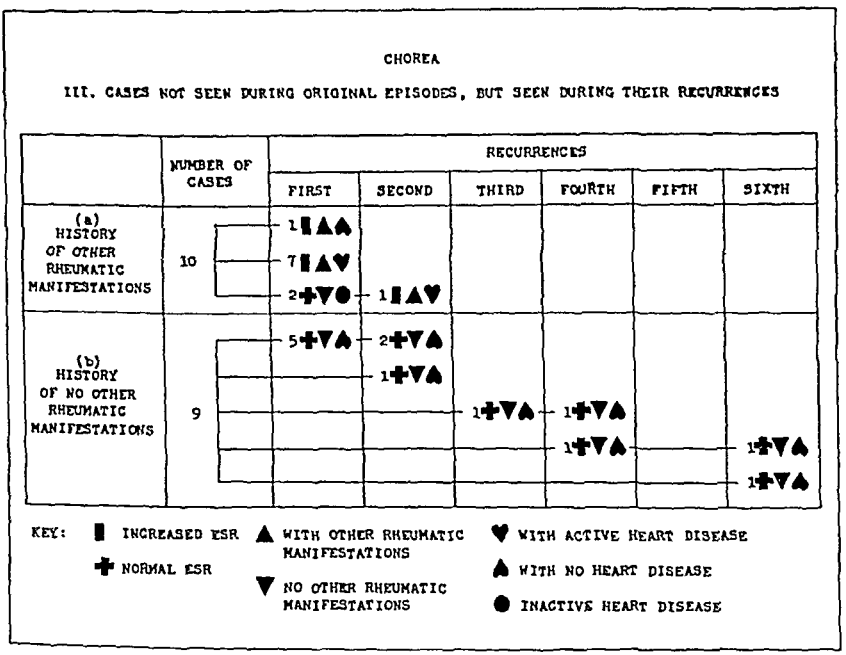


Chart 2.

Group III.—Patients Who Were Not Seen During Their Initial Episode of Chorea, but Who Were Seen for the First Time During Subsequent Episodes.—Of the total of 107 patients with chorea, nineteen were not seen during their first episode. Because of the above results, these nineteen patients were also divided into two subgroups: (a) those with a history of other rheumatic manifestations during their previous or first episodes of chorea, and (b) those with no other evidence of rheumatic activity in their previous history (see Chart 2).

Group III, a. Patients with a History of Other Rheumatic Manifestations During a Previous Episode of Chorea.—Of the nineteen patients who were not studied during their first episode of chorea ten gave a history of having had other signs of rheumatic activity. Of these ten patients, nine gave a history of active rheumatic heart disease as well as other signs of rheumatic activity during a previous episode, and one gave a history of other evidence of rheumatic activity but without heart involvement.

TABLE II. FOLLOW-UP ON TEN PREMATURE INFANTS

CASE	RACE	SEX	MONTH OF GESTATION	BIRTH WEIGHT (KG.)	1ST VITAMIN C DETERMINATION: AGE (DAYS)	1ST VITAMIN C DETERMINATION: TEST TIME (MIN.)	WEEKS AFTER BIRTH: 1	2	3	4	5	6	7	8	
1	W	F	7		1	4.9	2.6	5.0	3.5	2.7	3.4	3.4	3.9		Skin test time (min.)
				1.25		1.25	1.25	1.15	1.53	1.75	1.99	2.25	2.44		Weight (kg.)
								50	50	50	50	50	50		A. A. Adm.* (mg.)
2	W	F	8		3	5.0	6.7	5.7	4.3	4.1	5.5	3.7	5.4	4.7	Skin test time (min.)
				2.10		1.80	1.80	1.90	2.16	2.20	2.38	2.59	2.70	2.78	Weight (kg.)
										25	25	25	25	25	A. A. Adm. (mg.)
3	N	F	7		0	4.9	4.8	2.6	3.9	5.2	3.2	4.4	4.7	4.0	Skin test time (min.)
				1.77		1.77	1.59	1.72	1.90	2.00	2.07	2.25	2.52	2.92	Weight (kg.)
						50	50	50	50	50	50	50	50	50	A. A. Adm. (mg.)
4	W	F	7		1	4.9	5.0	3.5	3.0	2.3	4.5	5.1	5.1	4.5	Skin test time (min.)
				1.72		1.72	1.75	1.84	2.04	2.10	2.21	2.27	2.35	2.47	Weight (kg.)
									25	50	50	50	50	50	A. A. Adm. (mg.)
5	W	M	7		0	5.1	6.0	4.9	3.9	3.1	3.0	1.9			Skin test time (min.)
				1.79		1.79	1.46	1.56	1.90	1.97	2.04	2.37			Weight (kg.)
								25	25	25	100	100			A. A. Adm. (mg.)
6	W	M	7		1	3.3	3.7	3.3	3.2	3.0	3.2	2.1			Skin test time (min.)
				2.01		1.97	2.00	2.00	2.04	2.35	2.50	2.72			Weight (kg.)
								25	25	25	100	100			A. A. Adm. (mg.)
7	W	F	7		2	4.8	4.8	4.4	6.1	4.4	3.7	3.9	2.8	4.6	Skin test time (min.)
				1.76		1.68	1.75	1.81	1.92	2.10	2.25	2.50	3.00	3.86	Weight (kg.)
							50	50	50	100	100	100	100	100	A. A. Adm. (mg.)
8	W	F	8		5	5.2	5.2	2.8	4.2	2.3	3.7	3.0	4.8	2.8	Skin test time (min.)
				1.62		1.50	1.60	1.74	1.95	2.18	2.35	2.67	2.80	2.92	Weight (kg.)
							100	100	100	100	100	100	100	100	A. A. Adm. (mg.)
9	W	F	8½		5	4.3	4.3	4.2	3.9	4.0	2.7				Skin test time (min.)
				2.01		1.97	2.08	2.21	2.38	2.68	3.06				Weight (kg.)
						50	100	100	100	100	100				A. A. Adm. (mg.)
10	N	M	8		5	4.5	4.5	4.6	6.0	7.6	5.8				Skin test time (min.)
				2.25		2.07	2.08	2.18	2.41	2.71	3.06				Weight (kg.)
						50	100	100	100	100	100				A. A. Adm. (mg.)

*A. A. Adm. = ascorbic acid administration.

The temporal relationship to the onset of the choreic episode and the striking nature of certain psychogenic factors emphasize the probable etiologic role of psychic disturbance in this form of chorea. Such dynamic inciting factors as severe fright, unanticipated onset of menses, and a markedly disturbing change of teachers immediately preceding these episodes are good examples. One patient who was emotionally distraught, developed nonrheumatic chorea just after an intimate playmate had recovered from chorea. This suggests that in some cases imitation may be a factor. The concept of psychogenic chorea is not new. Indeed, before the discovery that rheumatic fever was a common cause it was generally believed that most chorea was psychogenic.

Hughes,[6] who made a careful study of this syndrome, reported a case wherein sudden fright not only incited the chorea, but a second fright caused it to stop. "A girl, who had been in the hospital for chorea, and who went out cured, had a return of her complaint. She was going to the hospital to apply for readmission, but, on her way, was much alarmed as she passed over London Bridge by a person being run over. She, however, pursued her course. On her arrival at the room in which the patients are selected for admission, both she and her mother were much surprised to find that the complaint had left her. She, therefore, went home again, and had not, so far as I know, any return of this disorder."

Recurrences may occur both in patients with rheumatic chorea and in those with nonrheumatic chorea. Recurrences were more common in the patients with rheumatic chorea (24 per cent) than in those patients with nonrheumatic chorea (6 per cent). Recurrences among patients with nonrheumatic chorea were always nonrheumatic. However, it can be seen from the data above and from Charts 1 and 2 that among the forty-eight patients with rheumatic chorea, there were four recurrences during which there was no other evidence of rheumatic activity and during which the erythrocyte sedimentation rates were normal.

Three of these recurrences seemed to be precipitated by psychogenic factors similar to those noted in nonrheumatic chorea. The home environment of one patient was characterized by a constant change from one unhappy foster home to another. One recurrence developed in a patient who returned to a home where she was very much resented by her mother and siblings, and where the home situation was characterized by jail sentences for the father and lack of moral code in the rest of the family. One developed in a patient whose family was irrationally overanxious about the possibility of a recurrence of the previous episode of rheumatic chorea. Thus, chorea may recur in a patient who has previously had rheumatic chorea, and the recurrence may be associated with a normal erythrocyte sedimentation rate. However, as in the above patients, such recurrences may be on a psychogenic rather than on a rheumatic basis. This would explain the normal sedimentation rate and lack of other evidence of rheumatic activity during these recurrences. Analyzing the dynamics involved in the first two of the above patients, one may reason that they found chorea to be a means of escape from unhappy home situations to the relatively secure,

PSYCHIATRIC SERVICES IN A CHILDREN'S HOSPITAL

S. A. SZUREK, M.D.
SAN FRANCISCO, CALIF.

THE advantages of psychiatric services in a general children's hospital are numerous and merit serious consideration. They appear to be in at least three categories: (1) the possible improvement of hospital care to the patients and their families; (2) the opportunities for increasing the quality and amount of psychiatric training of future pediatricians; and (3) the tremendous opportunities for research which would redound to the advancement of knowledge in not merely pediatrics but general psychiatry, and to the current interest in what is variously known as "psychosomatic" or "integral" medicine.

Each of these categories is a large and important field. They are obviously interdependent, and growth and development in any one would be reflected in, and enhance the growth and development of, the other two. Systematic and exhaustive discussion of any one would be difficult in view of space and time limitation here. But perhaps a few comments regarding each may still indicate the scope of the possibilities.

Concerning the need of psychiatric consultation service in a children's hospital perhaps not much needs to be said. The number of lonely, anxious, homesick children, and the number of aggressive, hyperactive children whose personality problems interfere with adequate treatment of whatever organic illness brings them to the hospital, is familiar to all experienced pediatricians. The neurotic components in such conditions as diabetes, cardiac diseases, epilepsy, metabolic disorders, the obesities, and the anorexias are also sufficiently well known. The host of allergic disorders of the respiratory and the gastrointestinal tracts, of the skin, and perhaps of other systems are by now of common interest to the pediatrician as well as the psychiatrist. The need for further study of the psychogenic factors in the choreas and in the nutritional disorders of infancy and early childhood is indicated by recent reseach.[1] The proportion of serious emotional reactions of children to various surgical procedures are probably as well known to the pediatrician as to the child psychiatrist. That the treatment of all these clinical problems in a children's hospital may be improved to the end that not only the current illness may be less complicated, but also that the personality development of the child may be fostered, is a desire of every pediatrician of experience.

Spock[2] and others have emphasized the critically important role and the strategic position of the pediatrician in furthering this goal of mental hygiene of the young and of future generations. It is not at all an exaggeration to say that the pediatrician may contribute more to this goal than the psychiatrist. Hence, there is growing interest of departments of pediatrics in our medical schools to give at least some psychiatric experience and training to future pediatricians. In a children's hospital with a well-organized psychiatric service, the

From the Langley Porter Clinic, San Francisco.

cent without); Jones and Bland[14] in 72 per cent of 482 patients (28 per cent without); Mackie[15] in 13.4 per cent of eighty-nine patients (86.6 per cent without); Poynton and associates[16] in 64.4 per cent of 104 patients (35.6 per cent without); Abt and Levinson[17] in 16.7 per cent of 143 patients (83.3 per cent without); Helmholtz[18] in 21 per cent of 138 patients (79 per cent without); Starr[19] in 17 per cent of 2,239 patients (83 per cent without); Thayer[20] in 21.6 per cent of 808 patients (78.4 per cent without); Batten[21] in 53 per cent of 115 patients (47 per cent without); Holt[22] in 56.7 per cent of 111 patients (43.3 per cent without); Sachs[23] in 11.4 per cent of seventy patients (88.6 per cent without); Osler[24] in 27.2 per cent of 110 patients (72.8 per cent without); Mackenzie[25] in 32 per cent of 439 cases (68 per cent without); and West[26] in 37.6 per cent of ninety-three patients (62.4 per cent without). This carries the data back to 1874.

If the total number of cases listed above are added together, there are 6,543 cases, with 33 per cent showing other evidence of rheumatic disease, and 67 per cent showing no other evidence of this disease. In the light of our analysis it is our contention that these figures indicate that the generally accepted conclusion that chorea is a manifestation of rheumatic fever is not valid. It is quite obvious that the reverse of the present argument may be used, that is to say, 67 per cent do not have other supporting evidence of rheumatic fever, and therefore chorea is not always a manifestation of rheumatic fever.

Of the above authors, some did question the rheumatic nature of all cases of chorea. Notable among these were Gerstley, Wile, and Falstein[12] and Coburn and Moore.[10] However, chorea is still considered to be a manifestation of rheumatic fever; and it is thus described in the chapters on rheumatic fever in current texts. Sutton and Dodge[9] concluded that "chorea should continue to be regarded not only as a manifestation but as a major manifestation of rheumatic infection," although only 52 per cent of their 467 patients had other evidence of rheumatic infection. Furthermore, 71.9 per cent of their 585 patients with rheumatic fever without chorea developed rheumatic heart disease, but only 50 per cent of their 467 patients with chorea followed for six years developed rheumatic heart disease. Jones and Bland[14] concluded that chorea was "a mild manifestation of rheumatic fever." However, their data shows that 86 per cent of their 518 cases of rheumatic fever without chorea developed heart disease, whereas only 3 per cent of 134 choreic patients without other rheumatic manifestations developed heart disease. Their data also show that of 348 choreic patients *with* other rheumatic manifestations 73 per cent developed heart disease.

A review of the early history of this disease is also most revealing. In the eighteenth and early nineteenth centuries, chorea was considered to be due to psychic factors, especially fear.[27] Stoll[28] in 1780 was probably the first to report cases wherein chorea and rheumatic fever coexisted. However, Roger,[29] in 1866, is generally credited with proving that chorea is a manifestation of rheumatic fever, and he refers to this association as a "loi pathologique." In Roger's day it was not generally known that rheumatic fever is common in

community, that perhaps although geographic distances might be reduced, there would still remain some isolation or separation of the psychiatric service from the rest of the hospital. There may be other objections. Against the second plan, on the one hand, there might arise the argument that without its own bed facilities, other necessary space and responsibility for its own nursing and attendant personnel, the psychiatric department might be somewhat hampered in its function of demonstrating and teaching its methods of treatment to the rest of the hospital staff. Specific research programs of the psychiatric staff might be impeded. Furthermore, the department's status and prestige, not unimportant considerations, within the hospital organization might suffer. On the other hand, if this latter problem were otherwise met, the efforts of the psychiatric service might then be channeled and diffused throughout the hospital personnel. If, for example, the recreational, occupational, and educational personnel were subordinated to the psychiatric service; if all nursing and resident staff were regularly indoctrinated, trained by, and recognized the responsibility of, the psychiatric services in the personal or emotional aspects of the child's adjustment to the hospital, some of its essential functions could then be performed.

The personnel of such a psychiatric service could easily be adapted from that of out-patient psychiatric clinics for children or from that of a child psychiatry department of a general psychiatric hospital. In both situations it consists of a time-tested, basic, clinical team composed of psychiatrist, psychiatric social worker, and clinical psychologist all trained in psychotherapeutic work with children and their parents. It is necessary to emphasize the qualification of training and experience in psychotherapeutic work with children and their parents. General psychiatric hospital training, even Specialty Board certification for the psychiatrist, has been amply proved by experience to be insufficient preparation for psychiatric work with children. A psychiatrist without thorough training in psychotherapeutic techniques with both children and adults is less well qualified if only because he is unprepared to treat (and therefore unprepared to teach pediatric residents how to treat) at least one half of the problem, namely, the conflicts of the parent. It is by now well established that advice, suggestions, and reassurance, not based on, or directed by, precise psychodynamic orientation, are of little use to either the parent or the child in the solution of their common and mutual problems. It is by now clear that psychiatrists untrained and inexperienced in the long, intensive, and detailed psychotherapy necessary are very apt to resign from chronic or severe psychogenic disorders by assigning the etiology to the unproved realms of the idiopathic organic, constitutional, or hereditary categories. Such psychiatrists find themselves in the unenviable position of being unable to give either leadership to their own ancillary nonmedical staff or help to their nonpsychiatric medical colleagues.

Similar considerations hold true for the psychiatric social worker and clinical psychologist members of the psychiatric team. If neither of these has had therapeutic experience with children *and their parents* the clinical efficacy of

group than in the rheumatic group, suggest that psychogenic factors are particularly important in nonrheumatic chorea. Future experience with the modern psychotherapeutic approach in these cases may yield much practical information.

Recurrences of chorea may be seen in patients with rheumatic chorea or in those with nonrheumatic chorea. In patients whose first episode of chorea is nonrheumatic, the recurrences are also nonrheumatic. In patients whose first episode of chorea is rheumatic, the recurrences are most likely to be rheumatic; but occasionally they may be nonrheumatic, possibly on a psychogenic basis.*

This concept of chorea is of great practical importance, not only because it singles out more clearly those patients with chorea who require closer study for possible sequelae of rheumatic fever, but it is equally important because it enables the physician to distinguish between these and those patients with chorea who do not have rheumatic fever and who need not fear the sequelae of this disease.

SUMMARY

Sydenham's chorea may be associated with rheumatic fever, or it may be nonrheumatic. Evidence to support this is adduced not only from our own data, but also from a re-evaluation of the data of previously reported studies.

Patients with nonrheumatic chorea are no more subject to the sequelae of rheumatic fever than are other members of the population.

REFERENCES

1. Holt, L. E., and McIntosh, R.: Holt's Diseases of Infancy and Childhood, New York, 1940; D. Appleton Century Company, p. 1202.
2. Mitchell, A. G., and Nelson, W. E.: Textbook of Pediatrics. Phila., 1945, W. B. Saunders Company, p. 851.
3. Brennemann, J.: Practice of Pediatrics. Vol. II, Hagerstown, Maryland, 1945, W. F. Prior Company, Inc., Chapt. 19, p. 15.
4. Landau, A.: Microsedimentation (Linzenmeier-Raunert Method), Am. J. Dis. Child. 45: 691, 1933.
5. Herzog, R. S..: The Microsedimentation Rate, J. Lab. & Clin. Med. 27: 355, 1941.
6. Hughes, H. M.: Digest of 100 Cases of Chorea, Guy's Hosp. Rep., London. 2.s, 4: 375, 1846.
7. Johnston, J. A.: Chorea, J. Mich. M. Soc. 45: 202, 1946.
8. Gibson, S.: Brennemann's Practice of Pediatrics. Vol. II, Chapt. 19, p. 15, 1945.
9. Sutton, L. P., and Dodge, K.: The Relationship of Sydenham's Chorea to other Rheumatic Manifestations, Am. J. M. Sc. 195: 656, 1938.
10. Coburn, A. F., and Moore, L. V.: The Independence of Chorea and Rheumatic Activity, Am. J. M. Sc. 193: 1, 1937.
11. Parrish, P. S., Taran, L. M., and Starr, S.: The Incidence of Heart Disease in Cases of Sydenham's Chorea, J. PEDIAT. 11: 617, 1937.
12. Gerstley, J. R., Wile, S. A., and Falstein, E. I.: Chorea: Is It a Manifestation of Rheumatic Fever? J. PEDIAT. 6: 42, 1935.
13. Schwarz, H., and Leader, S. D.: Latent Cardiac Complications following Sydenham's Chorea, Am. J. Dis. Child. 49: 952, 1935.
14. Jones, T. D., and Bland, E. F.: Clinical Significance of Chorea as a Manifestation of Rheumatic Fever, J. A. M. A. 105: 571, 1935.
15. Mackie, T. T.: Rheumatic Fever. An Analytical Study of 393 Cases of Rheumatic Fever and 89 Cases of Chorea, Am. J. M. Sc. 172: 199, 1926.

*Patients with rheumatic chorea may also have a persistence of their choreic signs after all other evidences of rheumatic activity have subsided and the sedimentation rate has become normal. The reason for the persistence of chorea in these patients is again not clear. Because of this, however, it is necessary to do sedimentation tests early in the illness to establish the diagnosis.

bility of doing still more effective mental hygiene and preventive psychiatry in well-baby clinics or in out-patient prenatal clinics (if these are included in such a children's hospital) by the relief of the numerous and common anxieties of mothers of infants and of prospective mothers.

Finally, to return to a previous point, the more thorough supervision and training of the resident pediatrician in such psychotherapeutic techniques as every physician can learn may be perhaps the most important contribution of modern psychiatry in the children's hospital to the generations that follow. Perhaps in such ways the life-long distortions of physiology and character by the culture-bearers, the predominantly neurotic parents of the present, may be somewhat ameliorated, and future generations may, perhaps, be somewhat better prepared emotionally to order their world more sanely than have we or our forbears.

REFERENCES

1. Ribble, Margaret: The Rights of Infants, New York, 1943, Columbia Univ. Press.
Hilgard, Josephine R., and Szurek, S. A.: The Successful Psychotherapy of a Choreic Syndrome, Psychosom. Med. 5: 293, 1943.
2. Spock, Benjamin and Huschka, Mabel: The Psychological Aspects of Pediatric Practice. Pract. Libr. Med. and Surg. 13: 757, New York, 1938, D. Appleton-Century Co.
3. Moloney, James Clark, Montgomery, John C., and Trainham, Genevieve: The Newborn, His Family and the Modern Hospital, The Modern Hospital 67: 43, 1946.
4. A Round Table on Institutional Treatment of Children at Annual Meeting of Am. Orthopsychiat. Assn. at Cincinnati, Feb. 1947, with papers contributed by Helen Sutton, Anne R. Benjamin, and Howard E. Weatherly, Bruno Bettelheim, and S. A. Szurek, J. Orthopsychiat. Assn. of 1947 or 1948, to be published.

A COMPARISON OF VITAMIN C IN MOTHERS AND THEIR PREMATURE NEWBORN INFANTS

LAWRENCE B. SLOBODY, M.D., RUEL A. BENSON, M.D., AND JOAN MESTLRN
NEW YORK, N. Y.

IN A recent report[1] we compared the mother's vitamin C with that of her full-term newborn infant by means of the intradermal test. The intradermal tests of the newborn infants and their mothers indicated that the newborn infants had a higher vitamin C tissue concentration than their mothers. These results were in substantial agreement with reports[2] of the neonatal-maternal plasma ascorbic acid relationship. Here, the plasma ascorbic acid concentration of the newborn infant has been shown to be considerably higher than that of the maternal blood. These similar results with both intradermal tests and blood levels have suggested the important concept that the fetus takes its supply of vitamin C and tends toward saturation, whether or not the mother has a sufficient amount.

We then proposed to compare the mother's vitamin C with that of her premature newborn infant. There have been few vitamin C studies in premature newborn infants. Steinebrei[3] did urine tests in prematures between 10 to 15 days of age (not soon after birth). He found less saturation than in normal newborns, but there was no connection between the degree of saturation and the body weight. An increase of vitamin C intake had no influence on the development of the premature infants. Levine and his co-workers,[4] in an excellent study, demonstrated that premature infants on vitamin C free cow's milk containing 5 Gm. or more of protein per kilogram, exhibited a spontaneous defect in the intermediary metabolism of aromatic amino acids. The administration of l-ascorbic acid completely eradicated the defect without necessarily raising the plasma ascorbic acid levels. Dann[5] found that premature infants receiving human milk retain a larger part of a "saturation dose" of ascorbic acid in their tissues than do infants given cow's milk. The hypothesis is offered that an increased daily requirement for vitamin C is related to a high level of protein intake.

PLAN OF STUDY

A comparison of the vitamin C in mothers and their premature newborn infants was to be made by means of the intradermal test.[6] This is a qualitative test based on the intradermal injection of a dye, which will be decolorized by vitamin C. A skin test time (time for disappearance of dye) of 14 minutes or more indicates a definite degree of tissue unsaturation; from 10 to 13 minutes is borderline, and less than 9 minutes a normal amount of vitamin C in the body tissues.

From the Frederick S. Wheeler Foundation for Nutritional Research and Department of Pediatrics, New York Medical College and Flower and Fifth Avenue Hospital.

which was followed by six similar stools within the next twelve hours. None of these were positive for blood to the benzidine test.

Since the abdominal mass persisted following relief of the obstruction, it was believed advisable to undertake surgical exploration because of the possibility of recurrent intestinal obstruction. After adequate hydration by administration of intravenous fluids the patient was operated on by Dr. Warren H. Cole who made the following operative note:

"A midline incision was made, which included the umbilicus. Upon entry into the abdominal cavity the mass could be visualized and was seen to consist of numerous loops of small bowel bound to a cystic mass composed of fibrinous material of no definite structure The interior of this cystlike cavity contained a small amount of clear yellowish fluid and underlying this a thick gummy layer of purulent material. Cultures were taken and a portion of the cystlike wall was sent to the pathology department for examination. The cyst was marsupialized to the anterior abdominal wall."



Fig. 1.—Roentgenogram illustrating distended loops in the left abdomen at the time of intestinal obstruction. A short vertical "ladder" pattern of small intestinal obstruction is also present.

Microscopic examination revealed that the cyst wall in some areas was a structureless mass of necrotic fibrin with polymorphonuclear and round cell infiltration and in other areas it was in contact with the anterior abdominal wall where there was an inner layer of fibropurulent exudate adjacent to a layer of granulation tissue with considerable fibrosis, round cell infiltration, numerous areas of calcification, and some deposition of yellow pigment.

The results are found in Table II. The intradermal test times indicated a good vitamin C concentration in the tissues in all the prematures throughout the study. Prematures who received 25 mg. of ascorbic acid daily had test times which compared favorably with those taking large doses. All the prematures gained weight. We had the impression clinically that the prematures receiving 50 mg. or more daily gained better than those receiving 25 mg. This could not be confirmed statistically in a small series such as this.

COMMENT

The average intradermal test time for the mothers of the premature newborn infants was 9.1 minutes. In a previous study of seventy-seven mothers of normal newborn infants, the average intradermal test time was 9.4 minutes. These similar figures contradict Jaroschka's[5] suggestion that vitamin C deficiency of the mother has a role in the occurrence of premature births.

The average intradermal test time for the premature newborn infants was 4.9 minutes and for the 77 full-term newborn infants, 5.0 minutes. The maternal-full-term newborn relationship was thus very similar to that of the maternal-premature newborn infant. As in our previous series, even where mothers were depleted of vitamin C, the premature newborn infants had a good tissue concentration. For example, in Case 1, the mother's intradermal test time for disappearance of the dye was 18 minutes and the premature's was 4.8 minutes.

It is difficult to explain how the premature and full-term newborn infants achieve good vitamin C tissue concentration even when their mothers are depleted. Lund and Kimble[2c] have presented good evidence that the placenta acts selectively to retain the vitamin C in the fetus. To add to this concept, we have suggested that the fetal nervous-humoral control for vitamin C is set at a higher level than that of the mother.

Since the intradermal test is qualitative rather than quantitative, we cannot say definitely that the premature has the same body stores of vitamin C at birth as the normal newborn infant. However, in preliminary blood studies of thiamine, which is also a water soluble vitamin, the premature seems to have as good a concentration as the normal newborn.

In view of the work of Levine and his associates,[4] and since the premature does have a more rapid metabolism than the full-term newborn infant, it would be wise in the present state of our knowledge to start ascorbic acid early, probably in the first week of life. The follow-up of the ten prematures indicates that 50 mg. of ascorbic acid daily gives good tissue concentrations of vitamin C.

SUMMARY

1. A comparison of the vitamin C in mothers and their premature newborn infants was made by means of the intradermal test.

2. The average intradermal test time for premature newborn infants was 4.9 minutes, and for their mothers, 9.1 minutes. This was similar to the full-term newborn-maternal relationship.

SUMMARY

An unusual case of intestinal obstruction in the newborn caused by an intra-abdominal abscess is presented. This abscess had its origin during fetal life.

REFERENCES

1. Mayo, C. W., and Remington, J. H.: Am. J. Surg. 72: 841, 1946.
2. Simpson, J. V.: Edinburgh Med. and Surg. J. 15: 390, 1838.
3. Dubler, A.: Virchows Arch. f. path. Anat. 111: 567, 1888.
4. Falkenheim, and Alkanazy, M.: Jahrb. f. Kinderh. 34: 71, 1892.
5. Zillner, E.: Virchows Arch. f. path. Anat. 96: 307, 1884.
6. Paltauf, A.: Virchows Arch. f. path. Anat. 111: 461, 1888.
7. Rudnew, W.: Inaugural Dissertation, Basel, 1915 (cited by Boikan[8]).
8. Boikan, W. S.: Arch. Path. 9: 1164, 1930.
9. Doran, A.: Proc. Roy. Soc. Med., London 7: 261, 1913-14.
10. Abt, Isaac A.: M. Clin. North America 15: 611, 1931.

3. The premature, like the full-term newborn, has a good vitamin C level at birth even where the mother is depleted.

4. 50 mg. of ascorbic acid daily begun in the first week insures continued good tissue concentrations of vitamin C.

REFERENCES

1. Slobody, L. B., Benson, R. A., and Mestern, J.: J. PEDIAT. 29: 41, 1946.
2a. Concepcion, I., and Camara, S.: J. Philippine Islands M. A. 19: 139, 1939.
b. McDevitt, E., Dove, M., Dove, R., and Wright, L.: Proc. Soc. Exper. Biol. & Med. 51: 289, 1942.
c. Lund, C., and Kimble, M. S.: Am. J. Obst. & Gynec. 46: 635, 1943.
d. Snelling, C. E., and Jackson, S. H.: J. PEDIAT. 14: 417, 1939.
e. Manahan, C. P., and Eastman, N. J.: Bull. Johns Hopkins Hosp. 62: 478, 1938.
f. Wahren, H., and Rundquist, O.: Klin. Wchnschr. 16: 1498, 1937.
g. Braestrup, P. W.: Acta paediat. 19: 328, 1937.
h. Montero Sierra, B.: Rev. Chilena de pediat. 11: 815, 1940.
3. Steinebrei, H.: Klin. Wchnschr. 18: 489, 1939.
4. Levine, S. Z., Gordon, H. H., and Marples, E.: J. Clin. Investigation 20: 209, 1941.
5. Dann, M.: J. Clin. Investigation 21: 139, 1942.
6. Slobody, L. B.: J. Lab. & Clin. Med. 29: 461, 1944.
7. Jaroschka, K.: München. Med. Wchnschr. 85: 1871, 1938.

by a boiled whole milk formula, orange juice, cod liver oil concentrate, and, at about 3 months, cereal and puréed vegetables.

For the three months previous the mother thought the baby was becoming weak, sickly, and pale, and his appetite had become poor. He would hold up his head, but did not sit up and had no teeth.

The baby's father was a 36-year-old American-born Chinese who was employed as a clerk in a Chinese grocery. The mother, 23 years old and born in China, came to this country one year previously for her marriage as prearranged by her family. The mother had hay fever; the father had no complaints. No history of familial diseases was elicited. There were no known tuberculosis contacts. One sibling, a 20-month-old girl, was in good health.

On physical examination, the baby appeared about the stated age, well developed, fairly well nourished, and in no acute distress. He weighed 14 lb., 15 oz. The skin was sallow, and lips and mucous membranes were pale, but there was no cyanosis or icterus. The head was normal in shape, the fontanelles open. The heart showed questionable enlargement to both the left and right. There was a loud systolic murmur over the whole precordium, heard best at the apex. The heart sounds were of good quality, with the pulmonary second sound louder than the aortic second sound.

The abdomen showed slight distention. The spleen was hard, well outlined, sharp-edged, smooth, and nontender, extending from the left costal margin to a point 2 cm. below the umbilicus. The liver was a more indefinite mass palpable from the right parasternal line to the right anterior axillary line, about 3 cm. below the costal margin. No other masses, herniae, or areas of tenderness were palpated.

The blood count showed 10,100 white blood cells with 26 per cent neutrophiles, 70 per cent lymphocytes, and 4 per cent monocytes, with many large, toxic, unclassified forms noted. The red cell count was 2,490,000 with 5 Gm. of hemoglobin. The anemia was hypochromic, microcytic in type, with erythroblasts, normoblasts, basophilic stippling, and many Cabot's ring bodies. Marked anisocytosis and poikilocytosis were present. Repeated blood counts were essentially similar. The platelets ranged from 60,000 to 105,000 per cubic millimeter, and there was no evidence of sickling. The blood was type B, Kahn negative. The sugar was 82 mg., chlorides 579 mg., urea nitrogen 15 mg., phosphorus 6 mg., calcium 10.7 mg., and serum bilirubin 3.9 mg. per 100 c.c. of blood. The coagulation time was four minutes, and the bleeding time two minutes. A fragility test showed hemolysis beginning at 0.48 per cent saline and being complete at 0.32 per cent, compared with a control beginning at 0.46 per cent and being complete at 0.36 per cent.

A sternal puncture for bone marrow study revealed 4 per cent myeloblasts, 28 per cent myelocytes, 9 per cent metamyelocytes I, 28 per cent metamyelocytes II, 26 per cent polymorphonuclears, 2 per cent eosinophiles, 3 per cent reticulum cells, and nucleated red blood cells (60 normoblasts, 108 erythroblasts, 7 megaloblasts, and 4 unidentified). In about 70 per cent of the erythroblasts, the cytoplasm was observed as heavy, irregular, blue-staining granules.

The urine was positive directly for bilirubin and positive for urobilinogen in a 1:160 dilution and negative in a 1:320 dilution.

On admission, roentgenograms of the skull showed no distinct bone changes that could be associated with anemia. The long bones showed a slight degree of atrophy of the medullary portions with a tendency to thinning of the cortex. There was also a tendency to condensation of the distal ends of the diaphysis with less than the usual degree of flaring.

The diagnosis of Cooley's erythroblastic anemia was made on the basis of these clinical and laboratory findings.

resident pediatrician might obtain such training not, as now in some training centers, for short periods of a few months on a psychiatric hospital ward for children, but more or less continuously throughout his residency. Psychiatric training in my opinion is not merely the acquisition of information about the classically described syndromes of psychoses and psychoneuroses, but is even more importantly a matter of acquiring a therapeutic attitude toward all emotional difficulties of people. Hence, time and exposure to trained personnel is essential to prevent compartmentalization of such knowledge and skill in the young pediatrician's mind. Furthermore, demonstration of the importance of the affective and the personal elements in all diseases by the psychiatric service will be a much more effective training method. It is perhaps not too much to expect also that the senior visiting staff of pediatricians might benefit and fill some gaps in their own training as a result of the participation of psychiatric personnel in the total treatment. One cannot omit either the advantages accruing to psychiatrists from the closer contact and collaboration with the pediatrician that integrating the psychiatric service into such a hospital would make possible.

The research that such collaboration would permit appears to be of inestimable scope. General psychiatric theory as to the genesis of personality traits and of personality disorder would obtain still another opportunity for testing and elaboration. Numerous questions need more intensive and detailed study. One question, for example, is the dynamism of repression of impulses of the infantile period as against their healthier integration into the self of the child and factors involved in each. The genesis of many somatic disorders now suspected of having large psychological components in their etiology and maintenance could be further explored. The obesities, the chronic states of malnutrition, the asthmas, the various vegetative instabilities, including hypertention, gastric disorders, and many others which express the anxiety of the individual, are a few of the conditions which come to mind. Necessarily, methods of treatment could be further refined and perhaps principles, upon which more effective hygiene and preventive programs could be based, might be derived. The value, content, and form of group prenatal preparation of mothers for the job of child rearing might be studied. The value of educational programs of various types via written word, radio, and visual-aid methods could be tested. The changes in methods of infant nursing during the confinement of the mother in the hospital as suggested by The Cornelian Corner,[2] together with further education of the obstetricians, would certainly be of great importance.

Concerning the general organization of such psychiatric services in a pediatric hospital one might consider two general possibilities. One of these is the establishment within the hospital of a ward or two for the patients of the psychiatric department. The other is to assign no actual bed space to the psychiatric department, but only office space for its personnel and rooms suitably equipped for their examinations and for play or interview therapy. There come to mind advantages and disadvantages to both plans, and local conditions, preferences, and purposes would be decisive. Against the first-mentioned plan are the considerations that this might be a duplication of other facilities in the

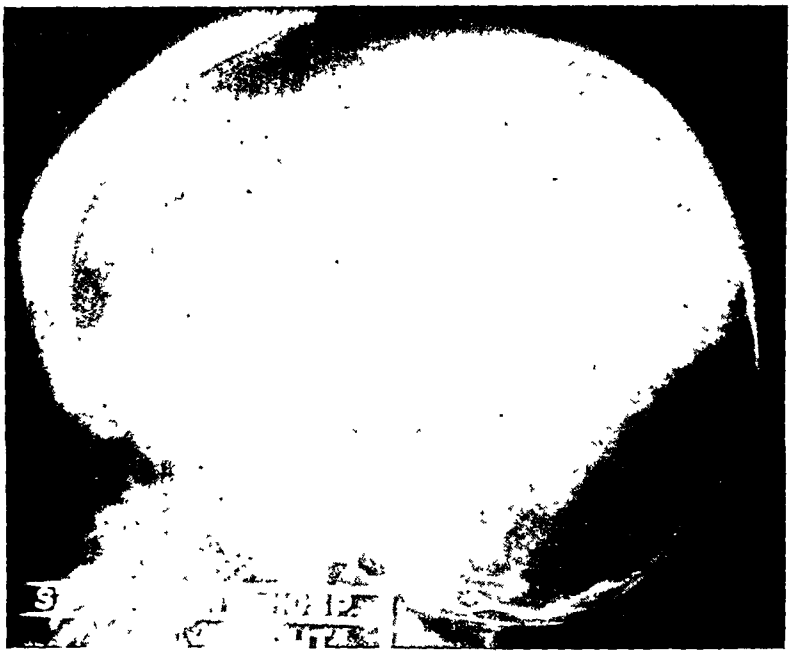


Fig. 1.—Case 1, K. L. Skull roentgenogram showing increase in thickness of frontal bone and fasiculation.



Fig. 2.—Case 1, K. L. Roentgenogram of hands showing cortical thinning and osteoporosis with increased trabeculation. Note squaring of ends of long bones.

their combined efforts is reduced. Experience in a state or other mental hospital for adults in obtaining social histories from relatives, doing follow-up studies upon patients after discharge, or performing other social case-work functions is not enough for the psychiatric social worker. She may too often, in the team contemplated, be called upon to deal therapeutically under the psychiatrist's supervision with one or another person of the family and perhaps even with the child himself if the parent presents the more formidable therapeutic problem requiring the psychiatrist's personal attention. As for the clinical psychologist, he, too, is less useful if his chief contribution consists of psychometry, educational and personality testing even if combined with the more modern projective techniques. Conceivably, if the psychologist is used for routine group or individual tests largely for diagnostic purposes, and perhaps for selecting patients requiring closer and fuller psychiatric scrutiny, then the therapeutic skills might be expected in the other two members of the team. Finally, it cannot be overemphasized that research and teaching prospects will vary directly as the psychotherapeutic skill of the psychiatric staff.

Another possibility in this connection is that all the social service workers of a hospital might either be psychiatrically trained, as outlined previously, or at least be administratively connected with the psychiatric services. This would ensure, or at least increase the probability that all work by the social workers with parents, other relatives, and the community will be integrated with the rest of the treatment, and that pertinent data will be collated for research, teaching, and treatment.

One cannot leave the problem of the psychiatric personnel without one or two comments regarding the nurses, attendants, and other specialists having contact with the patients, such as teachers, occupational and physical therapists, and recreation workers. Recent studies[4] are emphasizing the importance, in the total treatment of the child in the hospital, of the attitudes of such persons who may have closer and longer contact with the patients than either the resident or attending physicians. Pertinent here are not only the matter of selection of the emotionally relatively healthy for such staff positions, but also the need for regular inclusion of this portion of the staff in general discussions, conferences, and planning of treatment. Clearly and without ambivalence, to give recognition to their psychotherapeutic potentialities in such ways is being found to bring rich rewards in clinical results. All experienced clinicians know, but perhaps do not consistently make use of the knowledge, that the attitude and personality of the nurse is of crucial importance at times in the progress of the patient.

In conclusion, one can just hint at other problems and possibilities which result from integrating psychiatric services in a children's hospital. There is the need to work out methods of helping overburdened and frequently overanxious and oversolicitous mothers of the chronically ill child. The various debilitating or handicapping prolonged illnesses are often important factors in the psychological crippling of the child and in the enslavement of parents who must repress the understandable hatreds with resulting anxieties, self-criticism, and uncertainty in meeting the child's actual emotional needs. There is the possi-

The child had occasional episodes of fever, hyperpnea and lethargy, associated with epistaxis. There was poor response to transfusions and the patient's condition became progressively worse. He finally developed a generalized, puffy edema. There was a fever, the heart rate became very rapid and the heart sounds poor. The child died at the age of 4 years, 9 months. Permission for autopsy was refused.

A study of the blood of the patient's family is presented in Table I. None of them presented any symptoms of the anemia.

TABLE I. BLOOD STUDY OF FAMILY OF CASE 1

	FATHER	MOTHER	BOY 4 YEARS OLD	GIRL 6 YEARS OLD
Erythrocytes (in millions)	5.6	4.6	4.7	5.6
Gm. of hemoglobin	12.5	12.2	11.3	11.3
Target cells	moderate	moderate	few	few
Color index	0.76	0.90	0.82	0.68
Mean corpuscular volume	75 cu. μ	91 cu. μ	63 cu. μ	78 cu. μ
Hematocrit	42	42	30	44
Red cell fragility	*Initial* incomplete	*Initial* incomplete	*Initial* complete	*Initial* complete
Per cent saline	0.44 to 0.28	0.46 to 0.28	0.46 to 0.30	0.48 to 0.34

CASE 2.—P. M., a 3-year-old Chinese male infant, was admitted to St. Vincent's Hospital on Sept. 17, 1945. His parents first noticed a definite weakness and lack of activity when he was 7 months old. At that time, a local physician felt the child's spleen and advised hospitalization. The child was taken to another hospital where he received an investigation and periodic transfusions. There was no response to therapy and the parents took the child home for several months. He had occasional episodes of epistaxis, but there was no history of fevers or abdominal pain. Liver therapy and iron preparations had no effect on the blood picture or the child's symptoms. He was later taken to a second hospital and has been maintained by periodic transfusions until the present admission. The parents brought the child to this hospital in the hope that splenectomy would benefit him.

The child was born at home in New York City following a normal pregnancy. He was breast fed, and when weaned was put on an infant's diet of milk, cereal, and puréed vegetables. There was no history of childhood diseases, and no immunization. There were no known tuberculosis contacts, and the parents knew of no relatives who suffered from a disease similar to the patient's.

Both parents were born in China. The father had been living in the United States thirty years, and the mother, when the child was born, fifteen years. There are three siblings with no symptoms who are 17, 16, and 14 years of age.

On physical examination, the child appeared about the stated age and characteristically Chinese. His weight was 32 lb. There was an obvious pallor and the abdomen was slightly distended. The conjunctivae were pale, and there was a questionable icterus of the sclera. The pharynx was slightly injected and the mucous membranes were pale. The tonsils showed a moderate degree of hypertrophy but there was no cervical lymphadenopathy. The lungs were clear to auscultation and percussion, and the heart sounds were of good quality with no thrills or murmurs present. The abdomen appeared slightly distended, soft, and nontender. The spleen was palpable 7 cm. below the costal margin and very firm. The liver was 3½ cm. below the right costal margin, moderately firm, and nontender. The extremities were essentially negative except for pallid nail beds. The neurologic examination was noncontributory.

Case Reports

ABDOMINAL ABSCESS AS A CAUSE OF INTESTINAL OBSTRUCTION IN THE NEWBORN INFANT

JULIUS B. RICHMOND, M.D., AND HERBERT R. MOORE, M.D.
CHICAGO, ILL.

IN A recent review of congenital lesions resulting in surgical conditions of the abdomen, it is correctly stated that "the majority of serious maladies of early infancy are due to mechanical lesions or congenital lesions of a mechanical nature rather than any histopathologic alteration such as neoplasia or a primary inflammatory process."[1] We believe, therefore, that our recent experience with a newborn infant manifesting an inflammatory process in the form of an abdominal abscess resulting in intestinal obstruction is sufficiently unusual to warrant reporting.

CASE REPORT

A white male infant was transferred to our service on the fourth day of life because of an abdominal mass. The past history revealed that the infant was delivered spontaneously after a full-term gestation. The only significant prenatal history elicited was the occurrence of mild icterus of several days' duration in the mother during the fifth month of pregnancy. Recovery from the icterus was uneventful without any therapy and the obstetrician regarded the attack as a mild case of infectious hepatitis with no sequelae.

Physical examination of the infant on the first day of life revealed no abnormalities other than a large midabdominal mass. Inasmuch as the mass was not producing any symptoms, the infant was managed as a normal newborn. Breast feedings were well taken and retained; normal appearing meconium stools were passed. On the fourth day of life it was decided to transfer the infant to our service for further study.

Approximately one hour after admission to our service the infant developed severe vomiting which soon became fecal. No stools were passed at this time. Physical examination disclosed a well-nourished infant with marked abdominal distention. Dehydration was moderate. A large cystic mass which measured approximately 9 cm. in diameter was palpated in the midabdomen, the umbilicus being in the approximate center of the mass. It seemed directly under and attached to the anterior abdominal wall, but extended so deeply into the abdomen that the posterior wall could not be palpated.

A roentgenogram of the abdomen disclosed distended intestinal loops in the left abdomen and a short vertical "ladder" pattern of small intestinal obstruction (Fig. 1). The hemogram was as follows: 13.9 Gm. hemoglobin per 100 c.c.; 3,900,000 red blood cells per cubic millimeter; 10,000 white blood cells per cubic millimeter, with a differential count of 35 per cent neutrophiles, 5 per cent monocytes, and 60 per cent lymphocytes. The hematocrit was 38 mm. and the sedimentation rate was 8 mm. per hour (Wintrobe). The serum chlorides were within normal limits.

Decompression of the intestinal distention was promptly effected by continuous suction applied to a Levine tube which had been passed into the stomach. Twelve hours following admission the infant passed a small yellowish stool

From the Department of Pediatrics Research and Educational Hospitals University of Illinois College of Medicine

there was normal to diminished erythrocyte fragility. However, none of the relatives examined had any clinical signs of disease.

The writer wishes to acknowledge the assistance of the various members of the hospital staff in the presentation of this paper.

REFERENCES

1. Cooley, T. B., Witwer, E. R., and Lee, P.: Anemia in Children With Splenomegaly and Peculiar Changes in the Bones: Report of Cases, Am. J. Dis. Child. 34: 347, 1927.
2. Smith, C. H.: Familial Blood Studies in Cases of Mediterranean (Cooley's) Anemia, Am. J. Dis. Child. 65: 681, 1943.
3. Vorhees, N. W., and Sloan, F. R.: Mediterranean Anemia, J. A. M. A. 125: 352, 1944.
4. Valentine, W. N., and Neel, J. V.: Hematological and Genetic Study of Transmission of Thalassemia, Arch. Int. Med. 74: 185, 1944.
5. Cooley, T. B.: Presidential Address, Am. J. Dis. Child. 62: 1, 1941.
6. Bywaters, E. G. L.: The Cooley Syndrome in an English Child, Arch. Dis. Childhood 13: 173, 1938.
7. DhuyaGude, R. H.: Erythroblastic Anemia of Cooley in an Indian Boy, Am. J. Dis. Child. 67: 290, 1944.
8. Dameshek, W.: Familial Mediterranean Target Cell Syndrome, Am. J. M. Sc. 205: 643, 1943.
9. Foster, L. P.: Cooley's Syndrome (Erythroblastic Anemia) in a Chinese Child, Am. J. Dis. Child. 59: 828, 1940.
10. Wang, C. Y., and Khoo, F. Y.: Hemolytic Anemia With Erythroblastemia, Chinese Med. J. 58: 177, 1940.

Culture of the purulent material from this cystlike cavity demonstrated *Escherichia coli* the day following surgery. Consequently, streptomycin therapy, 60 mg. every three hours, was instituted in place of penicillin therapy, which had been administered following surgery. Sulfadiazine was given concurrently in doses of 0.1 Gm. every four hours. Blood transfusions, plasma, and fluids were given as supportive measures.

The operative wound healed well with no evidence of infection. Gradual oral feedings were begun on the third postoperative day and were gradually increased to full feedings during the following three days. The infant has now been observed six months postoperatively and has been entirely asymptomatic, manifesting entirely normal physical and mental development.

COMMENT

Intestinal obstruction in the newborn infant is most frequently caused by congenital anomalies. It was our impression preoperatively that we would encounter an omphalomesenteric cyst about which there had been some torsion of intestinal loops with resultant obstruction. When the mass was incised, however, it was obvious that it was not a simple cyst, but we still considered the possibility that it was an infected omphalomesenteric cyst. Careful inspection of the wall of the mass both grossly and microscopically failed to indicate any semblance of a cystic lining, suggesting that it probably was a pyogenic infection which had localized and become encysted by an inflammatory wall.

The precise time of onset of the inflammatory processs could not be ascertained, but the essential point of interest is the fact that it unquestionably had its origin during fetal life, inasmuch as it was observed on the first day of life. Its appearance and degree of localization also indicated that it was a process of relatively long duration. The culture of *Esch. coli* from the abscess suggests that this organism might well have been an invader during fetal life, which localized intra-abdominally, since there was no evidence to suggest postnatal contamination of the mass as might have occurred if the mass communicated with the intestinal lumen.

Since Simpson[2] reported a series of cases of fetal peritonitis in 1838 and reviewed the literature on the subject, numerous additional reports have appeared. Dubler[3] reported an abdominal cyst in a newborn infant which he believed due to an intrauterine perforation of the descending colon with resultant escape of meconium and consequent localization by fibrous adhesions and calcifications. Others[4-8] have reported cases of fetal peritonitis as a result of intestinal perforations and escape of meconium from the intestine. The phenomena arising as a result of meconium entering the peritoneal cavity have been described[8] as a reaction of the peritoneum to chemical and foreign body irritation with eventual formation of dense adhesions and calcified plaques. While it is not possible to state with absolute certainty that intestinal perforation and meconium peritonitis did not occur in our patient, this explanation for the abscess would not explain the culture of *Esch. coli* from the abscess without a demonstrable communication with the intestinal lumen.

It seems justifiable to speculate, therefore, that transplacental transmission of the organism occurred with the development of fetal peritonitis and ultimate localization with abscess formation. This possibility has been mentioned by Doran[9] and Abt.[10] No evidence of a maternal *Esch. coli* bacteremia could be established in retrospect, however, unless the brief maternal icterus was associated with bacterial invasion.

The postoperative course of our patient was uneventful. Although there has been no recurrence of the intestinal obstruction, this possibility exists because of the attachment of many intestinal loops to the abscess wall, which was marsupialized.

Gm.; white blood cells, 11,550; neutrophiles, 41 per cent; eosinophiles, 3 per cent; lymphocytes, 55 per cent; myelocytes, 1 per cent (8 per cent band forms) on admission. Before discharge on the next day, red blood cells, 3,520,000; hemoglobin 11 Gm.; white blood cells, 8,900; neutrophiles, 32 per cent; basophiles, 6 per cent; lymphocytes, 64 per cent; myelocytes, 4 per cent. He was given ferrous sulphate for his anemia and has remained well.

E. F., the late brother of S. F., was born on Oct. 26, 1944. Delivery was spontaneous, and it was noted that he had a cleft palate and lip, as well as a heart murmur and mongoloid features. He weighed 5 lb., 2 oz. at birth, gained very slowly, and was a feeding problem. At the age of 1½ months he developed a rhinitis for which he was given three drops of 0.05 per cent privine in each nostril. Soon thereafter his mother noticed that he became limp and hardly breathed. Examination did not reveal any other abnormalities; the lungs were perfectly clear, as in the preceding case. He was immediately hospitalized, given oxygen, and recovered in a short time. X-ray of his chest revealed moderate enlargement of the heart. Urinalysis was negative. Red blood cells were 4,230,000; hemoglobin, 85 per cent; white blood cells, 12,400; polymorphonuclears, 36 per cent; lymphocytes, 51 per cent; Myelocytes, 11 per cent (four normoblasts per 100 white blood cells). At the time, this case was not recognized to be one of privine sensitivity because of the presence of congenital defects. This baby subsequently succumbed to these defects at the age of 4 months. At autopsy he was found to have a patent foramen ovale, pulmonary edema, stenosis of the pulmonary valve, narrow pulmonary artery, hypertrophied right ventricle, and a cleft lip and palate.

Another local case, strictly speaking, not a hypersensitivity, has come to the author's attention.[3] A 14-month-old boy swallowed about 7.5 c.c. of 0.1 per cent privine. He slept for twelve hours and had a subnormal temperature. He was treated with caffeine and warmth, and made a complete recovery.

REFERENCES

1. Waring, J. I.: J. A. M. A. 129: 129, 1945.
2. Bonzanigo, C.: Arch. f. Kinderh. 94: 15, 1931.
3. Personal communication from Dr. Charles A. Murphy, Stamford, Conn.

COOLEY'S ERYTHROBLASTIC ANEMIA IN TWO CHINESE BOYS

LUTHER B. GARDNER, M.D.
NEW YORK, N. Y.

THE erythroblastic anemia which Cooley described in 1927[1] was characterized by splenomegaly, bone changes, leucocytosis, and a progressive, hemolytic, hypochromic anemia with many erythroblasts. A normal or decreased fragility of the red cells in hypotonic saline was also a constant finding. Subsequent cases reported showed this anemia to afflict consistently children with Greek, Italian, or Syrian forebears, and led to the opinion that it occurred only in individuals of Mediterranean stock. This racial incidence had also been observed in a latent form of the anemia in adults. Smith[2] studied sixteen families of Mediterranean origin in which Cooley's anemia had been found. He revealed abnormalities of the blood characteristic of the anemia in fifty-four of the sixty-three persons examined. Occasionally, this mild form in adults is associated with splenomegaly as well as the symptoms of anemia.[3]

The term Mediterranean anemia has been applied to this blood dyscrasia because of its prevalence in the offspring of families native to lands bounding the Mediterranean Sea. Valentine and Neel[4] have suggested the terminology of thalassemia major and thalassemia minor to differentiate between the acute fatal form and the latent subclinical form of the disease.[4]

Cooley, Smith, and others who have investigated this anemia, have not held the opinion that it is race limited, although the disease is familial and appears to follow mendelian laws of inheritance. Cooley[1] early considered the anemia the result of a mutation whose characteristics were strengthened by consanguinuity. The mutation could account for the sudden appearance of the anemia in a person of any race anywhere in the world.

A case of Cooley's anemia has been reported in an English child,[6] and five cases in Asiatic Indian children.[7] Dameshek[8] mentioned a case seen in a Negro child in New York City. Foster[9] reported a female child of Chinese parentage born in Hawaii who had Cooley's anemia.

Three cases of hemolytic anemia with erythroblastemia were seen in Chinese infants at Peiping Union Hospital.[10] All had splenomegaly, microcytic hypochromic anemia, and leucocytosis. The cell fragility, however, was increased in all three cases. The first case responded to iron therapy. Skull roentgenograms revealed thickening of the tables of the frontal bones, but faseulation was absent. These cases therefore, do not fit Cooley's criteria.

Two cases of Cooley's anemia in Chinese boys, not related, have been observed at St. Vincent's Hospital in New York City. One child survived a splenectomy for three years and ten months. The second child, a more recent patient, is being maintained on blood transfusions.

REPORT OF CASES

CASE 1.—(Reported through the courtesy of Dr. Edwin DiTolla, who referred the patient to hospital.) K. L., an 8-month-old Chinese male infant, was first admitted to St. Vincent's Hospital on Oct. 14, 1941. His mother reported failure to gain weight and a noticeable pallor.

The mother had a normal delivery following an uneventful pregnancy. The child's birth weight was 6 lb., 3 oz. He received breast feedings supplemented

From the Pediatric Service of St. Vincent's Hospital, New York, Dr. Stanley Brady, director.

JOURNAL, "showing why the American system is the best that the world has yet produced and your opinion whether or not medical care in the United States is adequate as it is."

It is not my intention to yield very far from my original statement that "any attempt to answer in detail or point by point the specious arguments advanced by . . . , the professional do-gooder's and fellow travelers is a mistake and a waste of time," as the "yes, it is, no, it isn't" type of argument leads only to acrimony and confusion. However, I shall attempt to explain further my views on the subject.

It takes a little pride in what is right with American medicine to state that it is the best that the world has yet produced under any system, without recourse to the statistics on morbidity and mortality and other recitations on the best features of American medicine.

The two main points around which the proponents of government in medicine center all their arguments are that (1) the cost of medical care is too high and (2) medical services are not adequately distributed. These defects are admittedly problems that must be met, but I submit that government in medicine will not solve them except at the sacrifice of personal freedom and private enterprise. The first Wagner-Murray-Dingell Bill (S. 1606-HR 4730) estimated that the cost of rendering governmental medical care would approximate four billion dollars annually and proposed that this sum be raised by a compulsory sickness tax of 4 per cent on the income of both employed persons and self-employed individuals up to $3,600 a year. The new bill, the so-called Wagner-Murray-Dingell-Pepper Bill (S. 1320) estimates the cost as approximately five billion a year, a very sizeable increase in the cost, even before the bill has been enacted and put into force. This increased approximate cost would necessarily increase the compulsory sickness tax to 5 per cent of income. Experience in European countries has shown, for those who will take the time to look at the records, that costs continue to increase with corresponding lowering of the quality of medical care in government-controlled schemes of medical care, and I am in agreement with those informed persons in this country who believe that the total annual cost of social and medical insurance in the United States will ultimately take about 25 per cent of the national income.

There are two basic reasons why the cost of a compulsory, Federally administrated system of medical care cannot be maintained at a stationary level over a long period of time. The first is the human factor. Individuals, both recipients and participants—at least a certain percentage of these individuals —will take every advantage of the system whether the sickness is real or imagined. The second basic reason is the political aspect of the administration of medical care. The popular, vote-getting appeal of broader coverage at less cost naturally is great, and politicians, likewise human beings, would not seriously oppose the popular demand for such liberalization. The greater tax burden necessary to implement the liberalization would, of course, have to be skillfully hidden.

The second defect in the problem of medical care—that of inadequate distribution—is again not solved by government-controlled medicine, except by the device of compulsion and regimentation of the members of the profession and of recipients of services. The new bill (S. 1320) makes a few changes in the administration of the national health insurance fund but still reads: "All functions of the Board shall be administered by the Board under the direction and supervision of the Federal Security Administrator." Other concessions have been made toward decentralization and toward the maintenance of the confidential nature of reports and the preservation of the doctor-patient relation-

The day following admission the temperature rose to 106° F. A transfusion of 150 c.c. of whole blood was given and the temperature rapidly returned to normal. The infant received seven transfusions during the first three months of his hospitalization and there were frequent and rapid variations in the size of the spleen. A surgical consultation was held with the pediatric staff and a splenectomy was decided upon. About fourteen weeks after admission, Jan. 26, 1942, when the spleen was considerably diminished in size, a splenectomy was performed under open drop ether. The operation was completed in forty-five minutes with very little loss of blood, and the patient was returned to the ward in good condition.

The spleen was enlarged and weighed 75 Gm. It was firm and enclosed in a smooth, glistening capsule. On section, the pulp presented a red, meaty appearance, and the splenic follicles were not visualized. The microscopic examination revealed the principal change to be in the Billroth's cords, which were considerably thickened due to fibrosis. In the splenic follicles, the germinal centers were conspicuously large and, in an occasional one, hemorrhage was present. The splenic sinuses were dilated and their lining cells swollen.

The postoperative course was uneventful. The child received elixir of feosol and two subsequent transfusions. The child was discharged to a convalescent home weighing 16 lb., 9½ oz., and with a blood count of 2.9 million red cells, 8.1 Gm. hemoglobin, and a color index of 0.98. The final smear showed normoblasts, erythroblasts, polychromasia, anisocytosis and poikilocytosis still present, and a platelet count of 638,330.

The child was readmitted on eight subsequent occasions. On each admission he received transfusions of citrated whole blood, and was returned in an improved condition to the convalescent home, where he received feosol and liver therapy.

The patient's final admission was on May 23, 1945. He was pale and poorly nourished and weighed 31 lb., 6 oz. The skull had prominent bilateral frontal bosses. The hair of the scalp was coarse and dry. The mongoloid characteristics of the face were accentuated by a small nose with a flat bridge. The heart appeared enlarged to both the right and left on percussion. The rhythm was regular but the sounds were of only fair quality, with a blowing systolic murmur over the entire precordium.

The lungs were clear to percussion and auscultation. The abdomen was distended, due to the enlarged liver, which was firm and nontender and extended two fingers below the umbilicus. The left upper quadrant scar of the splenectomy was well healed. The extremities were thin and spindly with cutaneous scars from the frequent transfusions.

The red blood count was 1.8 million and the hemoglobin 4 Gm. Successive counts ranged between 1.1 million and 2 million red cells and 4 to 5 Gm. hemoglobin. The hematocrit ranged from 14 to 16 mm. packed cell volume, the corrected sedimentation rate by the method of Wintrobe was 12 mm. per hour. The white blood count was 14,000, 54 per cent neutrophiles, 1 per cent myelocytes, 3 per cent metamylocytes I, 5 per cent metatmyelocytes II, 4 per cent eosinophiles, and 33 per cent lymphocytes. The platelets were 150.000 to 320,000 on this admission. A cell fragility test showed hemolysis to begin at 0.34 per cent and to be incomplete at 0.28 per cent, compared to a control that began at 0.44 per cent and was complete at 0.34 per cent.

The urine was positive in a 1:40 dilution and negative in a 1:80 dilution for urobilinogen, and positive directly for bile.

The x-rays of the skull at this time showed increase in thickness of the frontal bone and more pronounced fasiculation of the bony pattern. Examinations of the hands showed coarsening of the bony patterns, with osteoporosis and pronounced trabeculation.

think are foolish and poorly conceived attempts to too rapidly "improve" medicine, we must, however, be cautious that we ourselves are honest and realistic about our own profession and do not resort to specious phrases and shibboleths.

This letter is to object to one particular sentence in Doctor Palma's letter, "The cornerstone of our great system of American medicine, the best that the world has yet produced under any system, is the maintenance of the sacred doctor-patient relationship." Relative to other countries, I am sure that our system of medicine in this country is excellent. I do think, however, that it could be questioned whether it is best in *all ways*, and yet I see no possible way of proving this, since certainly the only data available, morbidity and mortality figures, would not have a direct bearing on the question. However, is the question the least bit important? Should not the real question be, is our system as good as it can be or as good as it ought to be, and can any changes be made that will further improve it? Why should we worry whether it is better than any other country's? Our automobiles are better, and our plumbing is better, but we still think something can be done to improve them.

If we asked many a common citizen of this country whether he feels that the medical attention he gets or can get is satisfactory, there would be no question about the pessimism of his answer. As physicians, we certainly feel that oftentimes his dissatisfaction is with the fundamental inadequacy of medical knowledge and not actually with its application, but, nevertheless, the common man expresses an opinion to which we must pay a great deal of attention, and he represents a great many votes. Many in our country do not feel that the medical attention they are getting is qualitatively satisfactory, and most do not feel that it is quantitatively satisfactory. We, ourselves, therefore, should be concerned about this critical attitude of the public and try to do something about it, rather than simply to reiterate that we are giving the best medical attention the world has produced. Anyone who has had an opportunity to critically evaluate the results of medical care as it is carried out on infants and children cannot help but be certain that far less than the best medical care that could now be given is actually being practiced. A great majority of physicians who are caring for children in this country have had less than one month's formal training in pediatrics. Many have had none at all. Although it is an ideal which will take a long time to reach, it is too much to ask that our children should be cared for by a physician who has had as much training as the minimum required by the American Board of Pediatrics, or are the advantages of such competence to be restricted to "upper classes"? We can say, certainly, that the practice of medicine with children is not as good as it might be if doctors were better trained and if there were more of them, and that we as physicians would not want our own offspring cared for by the majority of physicians in practice.

Let us look at the phrase "sacred doctor-patient relationship." This sounds a bit like something out of a city ward Fourth of July oration. To many it will seem a bit sanctimonious and hypocritical to use the word "sacred" about such medical matters. The family doctor who becomes the self-sacrificing and patient confidante, always on call to enter the whole economic, physical, and moral problems of the family, maintains a relationship very precious and valuable, and for which perhaps the word "sacred" might be used. Though many patients have the finest relationship with their doctors, we should ask ourselves whether any action of our government or any action of the American Medical Association can destroy or produce a good doctor-patient relationship. Isn't this something that the doctor himself in any circumstance must bring about? I cannot help but recall the instances where parents of children in a busy pediatric out-patient department, not knowing who was who among the



Fig. 3.—Case 2, P. M. Skull roentgenogram shows moderate thickening in frontal region and atrophy and mottling of the calvarium.



Fig. 4.—Case 2, P. M. Roentgenogram of hands showing cortical thinning and increased trabeculation of bony pattern.

$5,000 and $10,000 had 4 physician calls per person; between $3,000 and $5,000, only 3 physician calls; and below $3,000, only 2 to 2½ physician calls. Similar inadequacies were discovered in regard to general hospital care, dental care, immunizations, laboratory services, and refractions and glasses.[1]

Studies made in 1941 indicate some of the economic factors responsible for these inadequacies. In that year, families and single consumers with an income of $5,000 and over spent an average of $310 for medical care; those with incomes of $3,000-$5,000 spent $151; the $2,000-$3,000 income group spent $105; and those with incomes below $2,000 spent an average of $53 for medical care.[2]

How Many Americans Can Afford Medical Care?

In 1939, the Bureau of Medical Economics of the American Medical Association reached the conclusion that families with incomes of less than $3,000 sometimes require outside assistance in the case of major illness, while those with incomes below $1500 may need special assistance even for minor illnesses.[3] These data gain added significance when it is recalled that even in 1941, when the per capita income reached its highest pre-war peak, 51 per cent of American families and single consumers had annual incomes of less than $1500, and 85 per cent had annual incomes below $3,000.[2]

Do Most Americans Receive Adequate Medical Care?

It is true that there has been a substantial increase in money incomes during the war years. Nevertheless, the Federal Reserve Board reported that in 1945, at the peak of wartime prosperity, 47 per cent of all families and single consumers had total annual incomes of less than $2,000, 70 per cent had incomes of less than $3,000, and 92 per cent had incomes of less than $5,000.[4] Moreover, there has been a very substantial increase in the cost of living and the tax burden, so that real incomes have not changed nearly as much as the statistics for money incomes would appear to indicate. In addition, the costs of medical care have risen considerably, both because of scientific developments which have continued to make adequate medical care more expensive, and the general rise in costs of services which has increased the cost of hospital care, for example, to unprecedented heights. We may therefore conclude that the statement that a majority of the population does not receive adequate medical care is certainly as true today as it was before the war.

Medical Costs Are Uneven and Unpredictable

A major reason that inability to pay for medical care is not limited to the very lowest income groups lies in the uneven distribution of medical costs. In 1941, for example, among farm families with annual incomes of $750 to $1,000, 37 per cent spent less than $25 for medical care, while 18 per cent of the families spent anywhere from $100 to $500.[5] This uneven distribution holds true for all income groups. It is no comfort to the individual family to know that the *average* cost of medical care is 4 per cent of income. If a family with an annual income of $3,000 lays aside 4 per cent or $120 for medical costs, it may spend $10 or it may have to spend $1,000. To the individual family, medical costs are entirely unpredictable and often cause a crushing financial burden. There

[1] Medical Care for the American People—Committee on the Costs of Medical Care, No. 28, University of Chicago Press, 1932, p. 8.

[2] (Spending and Saving of the Nation's Families in Wartime) U. S. Dept. of Labor, Bull. No. 723, 1942, p. 2, p. 18.

[3] Factual Data on Medical Economics, Bureau of Medical Economics, American Medical Association, Chicago, 1939, p. 66.

[4] (*Federal Reserve Bulletin*, August 1946, p. 851).

[5] *What Farm Families Spend for Medical Care*, U. S. Dept. of Agr. Misc. Publ. No. 561, April 1945, p. 9.

Roentgenograms of the skull showed moderate thickening of the bone in the frontal region as well as generalized atrophy and mottling of the bones of the calvarium. The x-ray of the chest showed the heart to measure 9 cm. in the transverse axis, which was slightly over normal, average for this sized thoracic cage. The lungs were moderately congested but showed no other pathology. Roentgenograms of the hands showed definite alteration of the bony structures. There was thinning of the cortex and coarsening of the lamellar pattern in all the metacarpals and phalanges.

The leucocyte count was 6,250 cells per cubic millimeter with 48 per cent neutrophiles, 5 per cent metamyelocytes I, 6 per ment metamyelocytes II, one per cent myelocytes, 3 per cent eosinophiles, 36 per cent lymphocytes, and one per cent monocytes. There were 2.65 million erythrocytes with a hemoglobin content of 9.4 Gm There were 4 per cent erythroblasts, 2 per cent normoblasts, and one per cent Cabot's ring bodies per 100 white cells. Polychromasia and basophilic stippling were slight. There was moderate microcytosis, achromia, and anisocytosis, and slight poikilocytosis. There was no evidence of sickling of the erythrocytes. The serum bilirubin was 3.4 mg. per 100 c.c. The blood was type O, Kahn negative. A cell fragility test showed initial hemolysis beginning at 0.46 per cent concentration of saline and being complete at 0.32 per cent as compared with a control that began at 0.50 per cent and was complete at 0.40 per cent.

The analysis of the urine showed it to be normal.

The child was diagnosed as a case of Cooley's erythroblastic anemia. Splenectomy was not deemed advisable at this time and the child was discharged, to be maintained by periodic transfusions.

A hematologic study of the child's father, the only member of the family who would submit to the examination, showed 6 million erythrocytes with 16 Gm. hemoglobin. There was slight anisocytosis, polychromasia, and a few target cells. The mean corpuscular volume was 76 cubic micra, and the color index 0.8. The sickling preparation was negative. The reticulocytes were 1.6 per cent. The erythrocyte fragility test began hemolysis in 0.42 per cent saline and was complete in 0.34 per cent saline.

COMMENT

These cases illustrate further that Cooley's anemia is not limited to patients of Mediterranean origin.

The findings demonstrated by these two cases conform to the syndrome originally described by Cooley. There is a hemolytic, hypochromic anemia with erythroblastosis and a normal to decreased erythrocyte fragility. The roentgenograms of the long bones show the cortical thinning, and coarse medullary trabeculations characteristic in this disease. The bone changes in the first case were seen to become more and more pronounced while under observation. The skull, which was normal on admission, later showed increased thickening of the diploe and radial fasiculation. Neither case showed any response to hematinics or liver therapy.

The value of splenectomy in this disease is questionable. At present, it is doubtful if this operation alters the course of the disease, and the only indication for it is the discomfort caused by the increased size of the spleen. The target cells increased, following splenectomy, but these apparently are not a pathogenic factor.

As in Smith's series, hematologic investigation of these patients' families, in so far as their cooperation could be obtained, showed some evidence of the "trait" in the bloods examined. Target cells were present in all specimens, and

News and Notes

The **American Board of Pediatrics** will hold Fall examinations on Dec. 5, 6, and 7, 1947, at Dallas, Texas, and on Jan. 9, 10, and 11, 1948, at Philadelphia, Pa. For further information write The Secretary, 718 Royal Union Bldg., Des Moines, Iowa.

The American College of Physicians announces that a limited number of **Fellowships in Medicine** will be available from July 1, 1948 to June 30, 1949. These Fellowships are designed to provide an opportunity for research training either in the basic medical sciences or in the application of these sciences to clinical investigation. They are for the benefit of physicians who are in the early stages of their preparation for a teaching and investigative career in Internal Medicine. Assurance must be provided that the applicant will be acceptable in the laboratory or clinic of his choice and that he will be provided with the facilities necessary for the proper pursuit of his work.

The stipend will be from $2,200 to $3,000.

Application forms will be supplied on request to The American College of Physicians, 4200 Pine Street, Philadelphia 4, Pa., and must be submitted in duplicate not later than November 1, 1947. Announcement of the awards will be made as promptly as is possible.

The following pediatricians have been certified in the subspecialty of Allergy.

Dr. William Potter Buffum, 122 Waterman Street, Providence 6, Rhode Island
Dr. Joseph Harman Fries, 25 Plaza Street, Brooklyn 17, New York
Dr. Jerome Glaser, 300 South Goodman Street, Rochester 7, New York
Dr. John E. Gundy, 264 King Street, Port Chester, New York
Dr. Lewis Webb Hill, 319 Longwood Avenue, Boston, Massachusetts
Dr. Arthur J. Horesh, 10515 Carnegie Avenue, Cleveland 6, Ohio
Dr. Arthur Paul Keller, 423 Market Street, McKeesport, Pennsylvania
Dr. Morris Y. Krosnick, 257 Church Street, New Haven, Connecticut
Dr. Samuel J. Levin, 469 Fisher Building, Detroit 2, Michigan
Dr. W. Ambrose McGee, 1601 Monument Avenue, Richmond 20, Virginia
Dr. William Panitch, 90 Baldwin Avenue, Newark, New Jersey
Dr. Bret Ratner, 50 East 78th Street, New York City, New York
Dr. Orlindo L. Ross, 9 Exchange Place, Salt Lake City, Utah
Dr. Oscar M. Schloss, 125 East 72nd Street, New York City, New York
Dr. Hyman A. Slesinger, Windber Hospital, Windber, Pennsylvania
Dr. Joseph Weiner, 100 Whitney Avenue, New Haven, Connecticut
Dr. Benjamin Zohn, 1449 Union Street, Brooklyn 13, New York

HYPERSENSITIVITY TO PRIVINE

JACOB GREENBLATT, M.D.
STAMFORD, CONN.

AMONG the occasional reactions to privine* is a rare type of hypersensitivity peculiar to children, manifested chiefly by sedation and sometimes accompanied by mild collapse. This phenomenon has the characteristics of a true hypersensitivity in so far as it occurs following the recommended dose (one to two drops of 0.05 per cent privine in children). It also occurs following the accidental ingestion of much larger amounts of the medication; this cannot be classed as hypersensitivity, but the resulting syndrome is similar to reactions to therapeutic dosages in sensitive subjects. These two types of cases were decribed by Waring, and they are also the subject of the present report.

In 1945, Waring[1] reported three cases of sedation following the use of privine in children. One was a 3-month-old female, who was given two drops of 0.05 per cent privine in each nostril. On one occasion she slept eight hours, and on another occasion she slept twenty-four hours following medication. He also reports a 7-year-old girl, who was given five drops of 0.1 per cent privine in each nostril three times daily; she felt drowsy and talked vaguely for several hours subsequent to each treatment. The third patient was a 3-year-old girl, who drank about 8 c.c. of 0.05 per cent privine, and was drowsy for several hours. It is of interest to note that the first case had no reaction to the use of neosynephrine. Waring refers to Bonzanigo,[2] who found that ephedrine in large doses produces sedation in children between the ages of 3 months and 14 years.

Our first case is similar to the first one described above.

S. F. is a white male infant born Jan. 10, 1947, weighing 7 pounds, 1 ounce. Delivery was spontaneous; the mother's prenatal course was not unusual, and she was Rh-positive. Family history is negative for hypersensitivities except for a sibling, whose case is described in detail below. S. F. had an uneventful neonatal period, and made good progress on an evaporated milk formula and vitamins. On March 10, 1947, at the age of 2 months, he was given three drops of 0.05 per cent privine in each nostril for an attack of rhinitis. One-half hour later his mother noticed that he could not be aroused. He was examined shortly thereafter (by the author), and found to be pale and completely limp. Respirations were shallow; the rate was thirty times per minute. Several times per minute he would jerk his head to one side and gasp. Heart action was about 100 per minute. There was no fever; temperature varied between 98° F. and 99.2° F. (rectal). The baby could be aroused sufficiently to utter a faint cry when he was spanked; 0.2 c.c. of coramine was injected, and he was then hospitalized where inhalation of a mixture of 95 per cent oxygen and 5 per cent carbon dioxide was given, as well as 0.1 c.c. of epinephrine 1:1,000. At no time was he cyanotic however, and he was able to cry vigorously one-half hour after admission to the hospital. Still, he would lapse into a mild lethargy, and jerk his head and gasp intermittently. These signs gradually abated: three hours after admission he was able to take his formula, and after six hours all abnormal signs disappeared. X-ray of the chest did not reveal anything unusual about the heart or lungs. The blood study showed: red blood cells, 3,120,000; hemoglobin, 10.5

From the Stamford Hospital and the St. Joseph's Hospital, Stamford.

*Privine hydrochloride is a salt of 2 naphthyl-methyl-imidazoline dissolved in a medium containing phosphates, chloride, and dextrose. It is extensively used as a vasoconstrictor in rhinologic disorders, and is prepared in two concentrations: 0.1 per cent for adults and 0.05 per cent for children.

widely desirable and effective. The problem of how to reduce the one and retain the other, how to make medical care widely available without losing its effective qualities, is the core of the current problem in medicine. As this problem emerged after about 1915, the form it assumed and the solutions suggested naturally took their pattern from changing situations and social attitudes." All this has been stated before, but never any better or more concise than in the above quotations. So many fail to realize that much of the current debate over medical problems is in reality a debate over differing social ideologies, in which medicine offers a convenient focal point for discussion.

In the following chapters on "Medicine in Recent Decades" and "The Health of the Nation," the emergence of insurance as a factor in meeting and spreading costs and the status of the nation's health is described. The report finds that neither the contention of some that we are the healthiest nation in the world, nor the mortality statistics which prove that the United States ranks seventh among the nations with the lowest death rates, is meaningful under close scrutiny. As for the problem of medical services, "far too much emphasis" has been placed "upon the purely economic aspects. . . . While income factors are very important, exclusive and excessive emphasis on this tends to distort the problem. . . . For example, it is often said that the great trouble is simply inability to pay medical bills, and that if arrangements were only made to meet these, other problems would perforce be resolved. Actually, such an arrangement would very likely perpetuate poor standards of practice and probably extend them." This last quotation expresses the thinking of many of the pediatricians whose chief interest for years has been better medical care for the children of America in opposing the E. M. I. C. program and the Pepper bill fostered and promulgated by the Children's Bureau.

The next subjects considered in the report are medical care in urban and in rural areas, the latter being gone into in much detail. Chapter VI discusses the extension of the public health services. In one section of this chapter the inadequacies, needs, and financing of local health services are considered, and in another those of the federal and state health services.

Throughout the report, distinction between mere quantity and the quality of medical services is emphasized. In this respect the report differs from that of the majority report of the Committee on the Costs of Medical Care, which appeared in 1932, although in many of the final findings the two reports are in agreement. Most of the discussion in recent years has so centered upon the economic and social aspects, that the problems of the quality of medical care which are fundamental to better medical services have largely been ignored. The small Committee for the Improvement of Medical Care has been one of the few groups which has consistently stressed this aspect of the problem in its reports. It is for this reason that the three chapters, "The Quality of Medical Care," "Preventive Medicine," and "The Hospitals," which comprise about a third of the Academy Committee report, are so important in making it, as a whole, so comprehensive.

The committee finds that the provision of adequate medical care calls for many changes in medical education and practice. In medical education it must go back as far as the high school. Certain changes in the medical school program should be made in keeping with the development of scientific techniques, and the emphasis in instruction should be changed in part from the treatment of disease to prevention. The internship should be closely integrated with the medical school program. Medical practice to meet modern demands and utilize modern methods should be reorganized along lines of group practice, whose advantages and difficulties are considered in detail. Preventive medicine, defined as that which the physician furnishes the individual as contrasted with the public health medicine, which deals with large social groups, must be accentuated in medical education and developed in medical practice, if medical care is to be adequate to the individual.

The hospital, which has undergone such a complete transformation in recent years, is very thoroughly discussed from the technical, organization, and financial sides, and some twenty-two recommendations as to the hospital are made by the committee. The need

The Social Aspects of Medicine

The interesting letter from Dr. Joseph Palma published in the July issue of the JOURNAL OF PEDIATRICS contained this statement: "The cornerstone of our great system of American medicine—the best that the world has yet produced under any system—is the maintenance of the sacred patient-and-doctor relationship." Of course, the patient-doctor relationship which exists in this country is not peculiar to this country in any way. It has existed since the time of Hippocrates the world over. Both Professor Lichtenstein and Professor Wallgren made it clear in their contributions to the Column* that the entrance of the State into the system of medical care in Sweden has not interfered one particle with the patient-doctor relationship. To my way of thinking there is nothing peculiar either about the "great system of American medicine." It is the system again which has been practiced in Europe since the time of Hippocrates and came to this country with its settlement. What interested me very much in Dr. Palma's statement was the implication that since the system of medical care in this country is the best in the world, it does not require change. The question is extraordinarily important to all of us, because if our system of medical care is adequate, such an investigation as the Academy is conducting is entirely needless.

So far as I know, there is no way of establishing, statistically or otherwise, the superiority of one system of medical care as compared to another. Certainly one cannot establish it from mortality statistics in which economic factors and standards of education and living are fully as much concerned as disease. Infant mortality, as a matter of fact, is lower in several countries than in the United States. My personal belief is that the medical care in the Scandinavian countries is far and away superior to the medical care in the United States, but this is entirely a personal view. Certainly in the Scandinavian countries not only is general practitioner service available, but specialist service is available to every citizen, as is brought out by Professors Lichtenstein and Wallgren. In this country even general practitioner service is not to be had by all the population and the service of specialists is at the command of only the well-to-do and those of the middle and lower economic groups near large medical centers.

The question raised by Dr. Palma is so important that I asked him if he would be kind enough to write a special communication to the JOURNAL, giving in detail his point of view. At the same time I wrote to Dr. James Wilson and to Dr. Allan Butler for their views in regard to the adequacy of medical care in this country. The replies of Dr. Wilson and Dr. Palma follow.

E. A. P.

Dear Dr. Park:

A short time ago I prepared a statement on the social aspects of medicine, a copy of which was sent to the editor of the JOURNAL OF PEDIATRICS, the various state chairmen of the American Academy of Pediatrics, and to many of my friends throughout the country. You have courteously extended to me the opportunity of writing further on this subject for the column appearing in the

*Lichtenstein, A.: J. PEDIAT. 28: 503, 1946.
Wallgren, A.: J. PEDIAT. 30: 361, 1947.

"Government aid will be required." (Local, State, or Federal, or a combination, for the extension of hospital and health facilities, and aid to voluntary prepayment plans during the formative period.)

As a whole the report is one of the sanest and most comprehensive discussions that has been made on the problems of medical care. Parts will be unpleasant reading to the proponents of the *status quo*, while the radical element will be disappointed by its opposition to compulsory insurance. We hope the Commonwealth Fund which publishes the report, or some other source, will place the book on the shelves of every hospital and medical library, as well as our public libraries, so that it will have the influence it deserves on the thinking of those struggling in the complex problem of medical care.

B. S. V.

ship, but in the ultimate analysis the simple fact remains that the independent status of the physician and the profession will be sacrificed and that we will be taking care of our patients by directives and other orders from the Federal Security Administrator, who will be a lay individual. Those of us who had any considerable time under military medicine—an acknowledged necessity for the purpose of winning the war—have had enough of medicine by directives. We know that private enterprise and a free profession can do it better.

Application of the insurance principle offers a solution to the problem of the unequal distribution of the burdensome costs of medical care. The voluntary agencies already functioning in many states give promise of success, although many difficulties remain to be worked out. But no one should be misled into believing that the proposed Bill S. 1320 or any similar legislation is a sound application of the insurance principle.

All that is needed is further opportunity under our democratic system of free enterprise for the alert medical profession to continue its efforts to solve the admittedly two great problems—the increase in cost of medical care and the adequate distribution of medical service.

Finally, then, the solution of these problems is simply one of your individual philosophy. If you believe that the state is the master of the people or that progress can be made only by the state continuing to take unto itself increasing powers over the individual citizen and his freedom, if you believe that the best interests of all the people are better served by planning from the top, then you are for state medicine and the inevitable further traveling along the road to statism, collectivism, or whatever name you want to call it.

However, if you believe that the maintenance of health is the moral obligation of the individual; if you believe that to yield on even one small point of a principle is to lose all freedom eventually; if you believe that, under the democratic free enterprise system, America has created the *greatest system of* medical care yet produced under any system of government, and that we can continue to solve the problems of what is wrong with that system in the *future* as well as we have in the past; then you are definitely opposed to further extension of government in medicine.

Several answers to my original statement have expressed again the attitude that "It can't happen here." As an active participant in the tragic events of that memorable day, Dec. 7, 1941, I most vigorously oppose this point of view. There must not be a second Pearl Harbor.

JOSEPH PALMA, M.D., F.A.A.P.

Dear Dr. Park:

If progress is to be made in plans for the improvement of child health, discussion among physicians must always be objective, unemotional, and, when possible, factual. The opportunity that this column presents for a free exchange of opinion in open letters may assist in such objective thinking.

Reading the letter of Dr. Joseph Palma of Hawaii, I became concerned with an attitude of self-satisfaction and rather priestlike superiority that doctors too commonly assume to support their beliefs in medical-economic matters. Such attitudes are very unpersuasive to many lay people. Doctor Palma is bitterly opposed to what he calls "compulsory prepayment medical care." Many others, including myself, are frightened, as is he, by the possibility of grave and perhaps irreversible errors that may result from our government's rather naïve attempts to purchase good medical care wholesale for our people. In combatting what we



Crystalline Penicillin G Sodium Merck—An Improved, Highly Purified Product

- ★ No refrigeration required for dry form.
- ★ Therapeutically inert materials which may act as allergens have been virtually eliminated.
- ★ Minimum irritation on injection as a result of removal of therapeutically inert materials.
- ★ Meets exacting Government specifications for Crystalline Penicillin G.
- ★ Penicillin G has been proved to be a highly effective therapeutic agent.



CRYSTALLINE PENICILLIN G SODIUM MERCK

MERCK & CO., Inc. RAHWAY, N J

Manufacturing Chemists

MERCK MERCK

many white-coated men they saw, have insisted on being seen on a second visit by the same intern and have resented and refused the attentions of anyone else, including the chief of service. There we have a patient-doctor relationship which may not be sacred but is, nevertheless, good. The intern, even under the bad circumstances in a city hospital out-patient clinic can develop a doctor-patient relationship that is admirable. This relationship is surely a matter of personalities, of patience, and of kindness, not of buildings or organizations or governmental edicts. It is a pity that this phrase needs to be battered around for political purposes. I think we had better ask ourselves whether any doctor-patient relationship which must be maintained in the office of a physician who can spend not more than ten minutes for each patient is precious enough to be preserved at all costs. I certainly think that the most sacred aspect of a doctor-patient relationship is not likely to be well developed under the pressure of modern practice, and yet this is the circumstance that exists in a great many pediatricians' offices under the freest system which we ourselves can construct.

I firmly believe that the medical care in this country as given to the average patient would be much worse under the effects of such an omnibus of vaguely planned uplift that we see in the Wagner bill. I sincerely hope that our people's intense desire for more and more medical services, exploited by the inevitable tendency of government officials and public health men to increase their administrative authority, does not lead to premature and irreversible federal action that will at best improve the quantity at the cost of quality in service, but the way to prevent any ill-conceived government action is to improve our own organization and activities and not to rest contented with repeated dogmatic assertions of our own excellence.

(Signed) JAMES L. WILSON, M.D.

Ann Arbor, Mich.

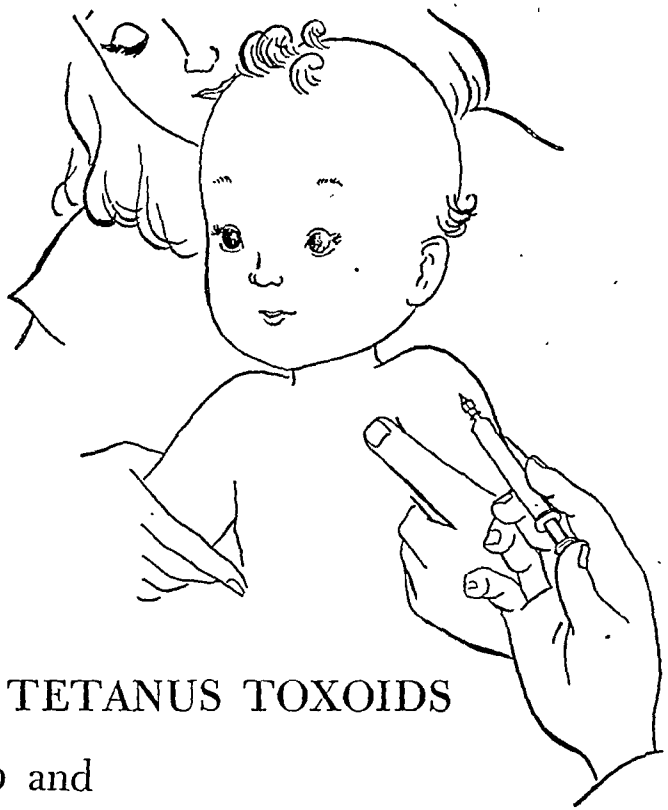
I have just received a copy of the testimony submitted on behalf of the American Public Health Association on Senate Bill 545, by Reginald M. Atwater, M.D., Executive Secretary. Since parts of it are pertinent to the question whether medical care in this country is adequate at the present time, I have obtained Dr. Atwater's permission to publish them. I do not publish the entire statement of Dr. Atwater because the remainder relates to the Taft Bill and I hope to present a complete critical review of this later. The relevant parts of Dr. Atwater's "testimony" follow: . E. A. P.

TESTIMONY ON BEHALF OF THE AMERICAN PUBLIC HEALTH ASSOCIATION ON SENATE BILL 545

R. M. ATWATER, M.D.

"A large portion of the population receives insufficient and inadequate medical care, chiefly because persons are unable to pay the costs of services on an individual payment basis when they are needed, or because the services are not available."* Numerous studies have documented the truth of this observation. The Committee on the Costs of Medical Care, which was headed by Dr. Ray Lyman Wilbur, found in 1928-31 that the lack of adequate medical care was not confined to the very lowest income groups but extended throughout all or most of the population. While professional standards called for approximately 5½ physician's calls per person per year, only those with an income of $10,000 or more attained this standard. Persons in families with incomes between

*Medical care in a National Health Program adopted at the 1944 Annual Meeting of the A. P. H. A.



for simultaneous

active immunization

DIPHTHERIA and TETANUS TOXOIDS

ALUM PRECIPITATED and

PERTUSSIS VACCINE COMBINED

SQUIBB

Among the many advantages of simultaneous immunization against diphtheria, tetanus and pertussis are:

- *Injections fewer and of smaller total volume*
- *Local and systemic reactions reduced to a minimum*
- *Greater convenience for physician and patient*
- *Less discomfort for the patient*

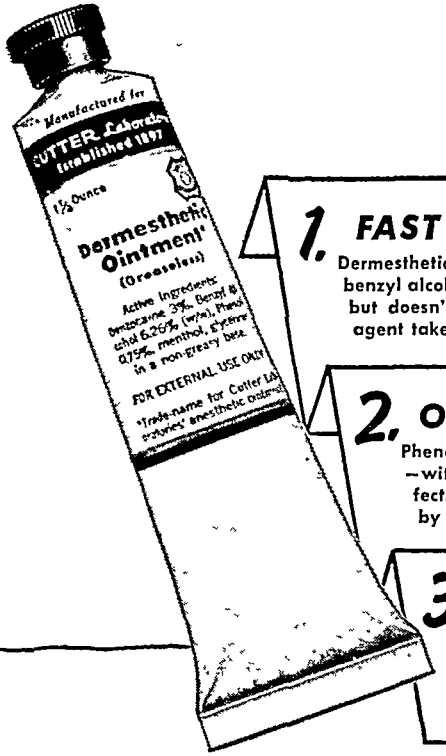
DIPHTHERIA and TETANUS TOXOIDS Alum Precipitated and PERTUSSIS VACCINE COMBINED SQUIBB is given in three injections of 0.5 cc. each at monthly intervals. This amount provides a full immunizing dose of both Diphtheria and Tetanus Toxoids and 45,000 million killed H. pertussis organisms.

In 1.5 cc. vials, providing 1 complete immunization.
In 7.5 cc. vials, providing 5 complete immunizations.

SQUIBB

MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1858

are few of us indeed who from personal resources can meet the medical costs of a disease such as cancer, or of a serious accident, with care lasting over a period of months and requiring the services of skilled specialists. That is why a national program of medical care must be oriented towards meetings the needs of the entire population, not merely the very low income groups. It is essential also that the program does not result in two separate systems of medical care, one for the poor and another for the well-to-do. for these reasons our Association declared that "A national program for medical care should make available to the entire population all essential preventive, diagnostic, and curative services."



1. FAST

Dermesthetic Ointment contains benzyl alcohol, which works fast but doesn't last. So the second agent takes over . . .

2. OVERLAPPING

Phenol offers intermediate relief —with moderately prolonged effect. And it in turn is overlapped by the third agent . . .

3. PROLONGED

Benzocaine, which has already begun to soothe the affected areas, continues to relieve itching over a prolonged period.

NEW TRIPLE-ACTION ITCH RELIEF!

CUTTER DERMESTHETIC OINTMENT* gives 3-phase control of pruritus! Acts fast—medium—slow! It relieves itching at once! It prolongs the soothing effect! It minimizes psychic trauma.

And here's the reason why... Cutter Dermesthetic Ointment provides three anesthetic properties with overlapping action.

Fast-acting, long-lasting Dermesthetic Ointment stops itching caused by poison ivy, poison oak, insect bites, industrial rashes and other pruritic conditions. Greaseless, it does not dissolve and spread oil-soluble irritants. It can be removed easily, will not stain skin or clothes.

While not intended as a bactericidal agent, Dermesthetic Ointment with its benzyl alcohol and phenol content is bacteriostatic. This bacteriostatic action, in combination with the quick, lasting relief from pruritus, helps to avoid possible infection from scratching.

Try it, won't you? Clinical samples will be sent on request.

*Cutter's trade name for Anesthetic Ointment

CUTTER

Fine Biologicals and Pharmaceutical Specialties

CUTTER LABORATORIES • BERKELEY 1, CALIF.

Book Reviews

Medicine in the Changing Order: Report of the New York Academy of Medicine Committee on Medicine and the Changing Order. New York, 1947, The Commonwealth Fund, 240 pages.

In December of 1942 the Council of the New York Academy of Medicine authorized the appointment of a group to study the complex problems of medical care. Under the Chairmanship of Dr. Malcolm Goodridge, with Dr. Iago Galdston as secretary, a committee of fifty was organized containing thirty-three physicians, many of whom are of national eminence, and seventeen social and civic leaders including representatives of the dental and nursing professions. The full committee and its planning and reviewing groups held 120 meetings in the course of its three-year study. Over fifty men and women were invited and appeared before the committee, representing all of the related fields of medical care as well as all shades of economic and social thought. In addition, the committee fostered a number of studies, some of which have been reviewed previously in the JOURNAL.*

The work of the committee was financed by grants from the Millbank Fund, the Josiah Macy Junior Foundation, and the Commonwealth Fund. The original resolution of the Academy Council was to the effect that a committee be appointed "with unlimited latitude to study present trends in medicine." The committee defined its objectives as follows: "To be informed on the nature, quality, and direction of the economic and social changes that are taking place now and that are clearly forecast for the immediate future; to define in particular how these changes are likely to affect medicine in its various aspects; to determine how the best elements in the science of medicine and in its services to the public may be preserved and embodied in whatever new social order may ultimately develop."

The reviewer has gone into detail as to the origin, purposes, and work of the committee, since this final report, the result of an unbiased, thorough study, will beyond question have a decided influence on medical thought and practice, and in charting the course for changes in medical care in the near future.

In its first chapter on the "Origins of the Present Problems," the report discusses from a historical standpoint the development of medicine as a science, the rise and impact of preventive medicine, the growth of hospitals, and the progress in medical education. This development of medicine as a science led to the present economic problems of medical practice. "But as medicine and surgery progressed the whole situation changed. . . . The mounting costs of medical practice confront the public in the shape of fees charged by physicians, hospitals, laboratories, and the like. But the origins of the costs are essentially those very precise, involved, and expert procedures which make modern medicine so

*Government in Public Health. H. S. Mustard. 30: 533, 1946. Medical Education and the Changing Order. B. Allen. 29: 535, 1946.
American Medical Practice in Perspectives of a Century. B. J. Stern. 29: 534, 1946.
A Future for Preventive Medicine. E. J. Stieglitz. 29: 534, 1946.

The medication of choice in TOPICAL CHEMOTHERAPY



White LABORATORIES INC.
Pharmaceutical
Manufacturers,
Newark 7, N. J.

for rural hospitals to furnish technical facilities is recognized. The importance of O.P.D. extension and of the hospital as a nucleus for group practices is stressed.

In Chapter XI the report takes up the question of medical insurance as a specific topic, although it is referred to many times in previous sections of the report. The discussion is thorough and fair and we quote some of the findings. "The problems which compulsory national medical insurance engenders appear so formidable, and the evils it threatens so plain, that the committee strongly advises against hasty action. Once the country commits itself to this type of policy and legislation it cannot retrace its steps. . . . The Committee believes that medical insurance is one of the essential requirements in solving the problem of medical care distribution. It agrees that compulsion by government would accelerate the extension of insurance to all the people. It agrees, also, that voluntary insurance will spread only slowly and incompletely among the low-income families. It is at the same time convinced that voluntary insurance provides flexibility for local initiative and is designed to encourage new and better methods of organized medical services, such as group medical practice, within the physical and personnel limitations of each area . . . everything should be done, by way of grants, subsidies, and employers' contributions to hasten the growth of voluntary medical insurance." This last implies that tax money grants should be made to voluntary insurance schemes to furnish medical care for those with an income too low to participate on an independent basis. Coverage should also be extended to higher income groups to spread the risk by increased coverage. The same medical service naturally would be furnished to all participants.

In the final chapter (XII), "The Method and the Goal," the committee makes a comprehensive statement of its views and findings, some of which have been discussed above. The Committee is in agreement on many points: Medical service should provide all that science can offer, and its benefits should be available to all. Medical service at present is not optimally organized, and plans for its improvement should be based on study and not directed to the support of preconceived schemes not based on such study. No one plan can be applicable to all people of our country, and hence experiments are needed. While the general public has a vital interest in plans for changes, the physicians should have a dominant rôle in the preparation of plans which they will be called upon to carry out. Gradual improvement and extension are preferable to revolutionary changes. While government has a direct responsibility, rapid and sweeping changes brought about by legislation would defeat their own purposes by impairing the spirit and quality of medical care.

Surely there is no thinking person who is interested in better medical care who cannot be in agreement with the committee in these findings. They doubtless will be unsatisfactory to those who believe in a totalitarian system of government, whether they be fascists or communists.

Specific formulations are as follows:

"In extending medical service and perfecting its organization, quality must be preserved.

"Provision of public health services is a prime essential.

"Improvement in medical service requires effective use of hospitals with adequate facilities.

"Success will require trained professional and nonprofessional personnel.

"For optimal results, organization and cooperation of physicians are required. [Group practice.]

"In the improvement of medical services, voluntary prepayment plans are needed.

"The goal should be comprehensive medical service. [Health supervision and preventive as well as curative treatment.]

"Extensive education for both physicians and the public will be required.

"Progress in the extension of medical service must be varied and adapted in each instance to the needs of the community.

Articles to appear in early issues of

The JOURNAL OF PEDIATRICS

SCLEREMA ADIPOSUM NEONATORUM.
By Albert Sternbach, M.D., and Joseph Robinson, M.D., Brooklyn, N. Y.

FRIEDLÄNDER'S PNEUMONIA IN INFANCY.
By Bertram W. Miller, M.D., Harry W. Orris, M.D., and Harold H. Taus, M.D., New York, N. Y.

OMPHALOCELE WITH DIAPHRAGMATIC DEFECT AND HERNIATION OF THE LIVER INTO THE PERICARDIAL CAVITY.
By Lieutenant Wallace W. McCrory, and Lieutenant Colonel Rollin F. Bunch, Medical Corps, Army of the United States.

A REVIEW OF THE SUBJECT OF CONGENITAL HEMIHYPERTROPHY AND A COMPLETE CASE REPORT.
By John Ward, M.D., and Henry H. Lerner, M.D., Salt Lake City, Utah.

SOME FACTORS WHICH INFLUENCE THE DURATION OF BREAST FEEDING.
By Mildred A. Norval, M.D., Rochester, Minn.

DENTAL CARIES EXPERIENCE IN POSTWAR ITALY (1945). II. AMONG TEEN-AGE CHILDREN IN NAPLES.
By Maury Massler, D.D.S., M.S., and Isaac Schour, D.D.S., Ph.D., Chicago, Ill.

THE PRIMARY ETIOLOGY OF THE SPECIFIC LANGUAGE DISABILITIES.
By Richard S. Eustis, M.D., Boston, Mass.

THE SUBCUTANEOUS ADMINISTRATION OF SODIUM SULFADIAZINE.
By Gilbert B. Forbes, M.D., George Donnell, M.D., and John C. Herweg, M.D., St. Louis, Mo.

RHEUMATIC FEVER RECURRENCES IN CHILDREN WITHOUT SULFONAMIDE PROPHYLAXIS: AN EVALUATION OF ENVIRONMENTAL FACTORS.
By Robert L. Jackson, M.D., Helen G. Kelly, M.S., Cecilia Healy Rohret, M.A., and Julia M. Duane, M.D., Iowa City, Iowa.

COMPARATIVE ABSORPTION, EXCRETION, AND STORAGE OF OILY AND AQUEOUS PREPARATIONS OF VITAMIN A.
By J. M. Lewis, M.D., O. Bodansky, M.D., J. Birmingham, M.D., and S. Q. Cohlan, M.D., New York, N. Y.

PERTUSSIS-PARAPERTUSSIS VACCINE.
By Alwin C. Rambar, M.D., and Katherine Howell, M.D., Chicago, Ill., and Edward J. Denenholz, M.D., Modesto, Calif.

RABIES. A CASE REPORT WITH NOTES ON THE ISOLATION OF THE VIRUS FROM SALIVA.
By Carl E. Duffy, Ph.D., Paul V. Woolley, Jr., M.D., and Wilfred S. Nolting, M.D., With the Technical Assistance of Norma H. Feeley, Detroit, Mich.

SALMONELLA CARRIER TREATED SUCCESSFULLY WITH STREPTOMYCIN.
By Helen E. Swiller, M.D., A. Irving Swiller, M.D., and Frederick B. Traub, M.D., Brooklyn, N. Y.

PROLONGED ANURIA FOLLOWING A SINGLE INJECTION OF A BISMUTH PREPARATION.
By Carl L. Petersilge, M.D., Cleveland, Ohio.

FEBILE CONVULSIONS: A CLINICAL STUDY WITH SPECIAL REFERENCE TO HEREDITY AND PROGNOSIS.
By Samuel Livingston, M.D., Edward M. Bridge, M.D., Laslo Kajdi, M.D., Baltimore, Md.

A NEW TREATMENT FOR DIAPER RASH. PRELIMINARY REPORT.
By Reuel A. Benson, M.D., Lawrence B. Slobody, M.D., Lois Lillick, Ph.D., Anthony Maffia, M.D., and Norbert Sullivan, M.D., New York, N. Y.

Every living set of quadruplets born in the U. S. since 1936 has been fed Evaporated Milk

ALTOGETHER nine sets of quadruplets have been born since that date, in which all babies have lived. In each of these cases the physician in charge has approved an evaporated milk formula.

Five of these sets are thriving on Pet Milk, taking it either from nursing bottle or cup. Although these famous children range in age from infancy to eleven years, Pet Milk has been their continuous milk supply. Sturdy, splendidly developed children, they are impressive proof of the fact that babies need never be weaned from evaporated milk.

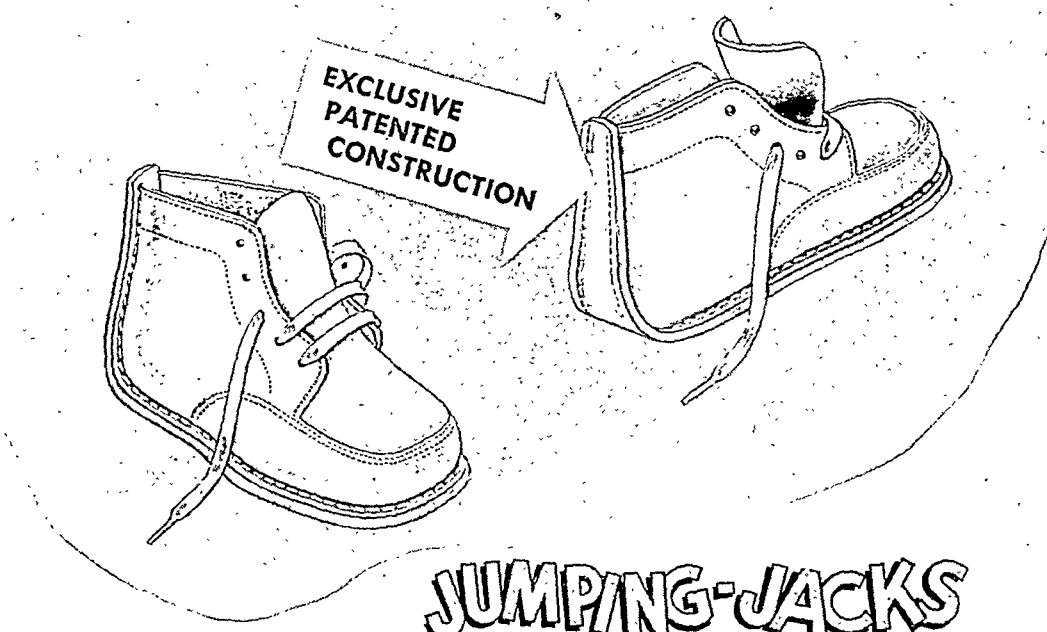
The highly successful use of Pet Milk in these difficult multiple-birth cases is of interest to the physician engaged in the feeding and care of children. It is good assurance of the suitability of this extraordinary form of milk for the infants and children under your care.

Pet Milk Company



Arcade Building
St. Louis 1, Mo.

UMPING-JACKS . . . FOR CHILDREN 6 MONTHS TO 3 YEARS OL

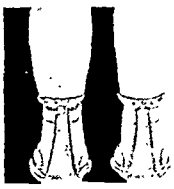


JUMPING-JACKS

SOFT SHOES FOR HARD WEAR

NOT CORRECTIVE...BUT *Correct* SHOES FOR TODDLERS

Because of that extension sole, continuous from the toe all the way up the heel to the shoe-top, children who learn to walk in Jumping-Jacks learn right! Because Jumping-Jacks are correctly designed for their purpose, they minimize the chance that corrective measures will be needed later.



THEY DO THESE SIX THINGS:

- Make the child walk straight by holding the heel bones in correct position.
- Prevent the ankles from turning in or out.
- Develop foot and leg muscles . . . no stiff counters or shanks.
- Hold their shape until outgrown . . . no heel or striking edge to wear off.
- Provide proper flexibility . . . walking in Jumping-Jacks is like walking barefoot.
- Furnish correct support so that the child will step out with confidence.

Jumping-Jacks are also tops in materials and workmanship, excellent values, and so good-looking mothers want their children to wear them. You can recommend them with complete confidence.

Write for descriptive literature and name of nearest Jumping-Jack dealer

VAISEY–BRISTOL SHOE CO., INC.

625 SO. GOODMAN STREET • ROCHESTER 7, N. Y.

new



penicillin troches-C.S.C.

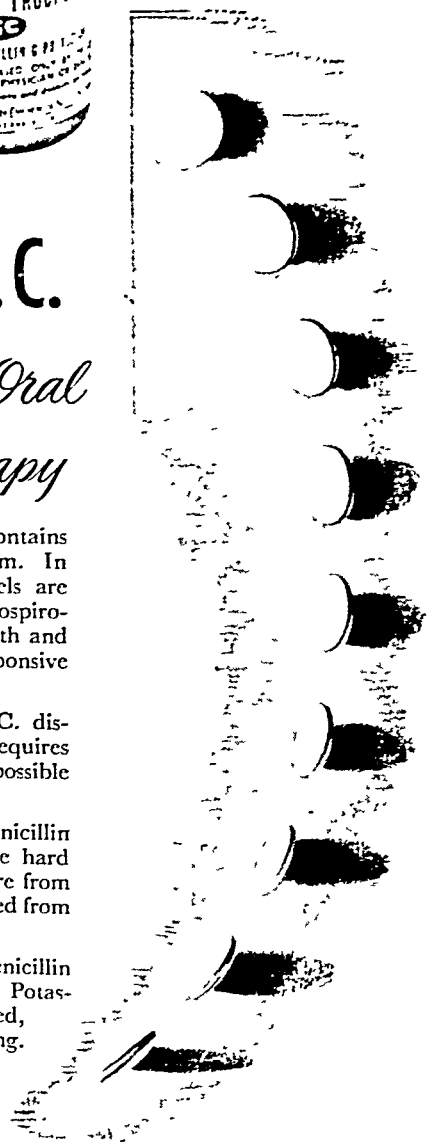
For Prolonged Intra-Oral Penicillin Therapy

HIGH POTENCY. Each Penicillin Troche-C.S.C. contains 5,000 units of Crystalline Penicillin G Potassium. In consequence relatively high penicillin saliva levels are attained for maximal therapeutic efficacy in fusospirochetal (Vincent's) infection of the gingivae, mouth and pharynx, and certain other oral infections responsive to penicillin.

SLOW DISINTEGRATION. Penicillin Troches-C.S.C. dissolve slowly within the mouth, a process which requires from one to two hours. Thus prolonged action is possible from a single troche.

ADHERES TO PALATE. Lenticular in shape, Penicillin Troches-C.S.C. readily fit into the curve of the hard palate, adhering to the mucosa on gentle pressure from the tongue. A penicillin depot is thereby established from which the antibiotic diffuses into the saliva.

CRYSTALLINE POTASSIUM PENICILLIN G. Penicillin Troches-C.S.C. contain Crystalline Penicillin G Potassium Salt. This form of penicillin is highly purified, having a potency of not less than 1435 units per mg.



C.S.C. Pharmaceuticals
A DIVISION OF
COMMERCIAL SOLVENTS CORPORATION
17 E. 42nd Street — New York 17, N.Y.

NAIL LACQUER

To meet the demand of allergists and dermatologists, we are submitting a new nail lacquer. It is now ready for your use in patch testing and for trial use by your patients who have been found sensitive to nail lacquers. Write now for full size clinical trial packages.

Marcelle
HYPO ALLERGENIC
COSMETICS

MARCELLE COSMETICS, INC.
1741 N. Western Ave., Chicago 47, Ill.

Benzedrine Inhaler, N. N. R.
". . . is quite effective in the clearing of nasal congestion due to allergy or infection."

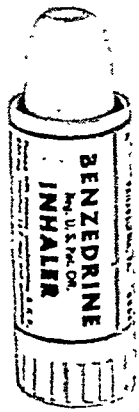
Feinberg, S. M.: Allergy in Practice, Chicago, The Year Book Publishers, Inc., 1944, p. 502.

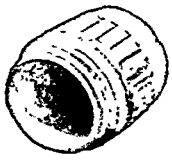
Your hay fever patients will be grateful . . . particularly between office visits . . . for the relief of nasal congestion afforded by Benzedrine Inhaler, N. N. R. The Inhaler may make all the difference between weeks of acute misery and weeks of comparative comfort.

Benzedrine Inhaler

ACCEPTED COUNCIL ON PHARMACY AND CHEMISTRY AMERICAN MED. ASSOCIATION

Each Benzedrine Inhaler is packed with racemic amphetamine, S K F, 250 mg.; menthol, 12.5 mg.; and aromatics.





a better means of nasal medication

Smith, Kline & French Laboratories
Philadelphia, Pa.

You Should Subscribe Now for These Special Journals

American Journal of Obstetrics and Gynecology

Representing The American Gynecological Society, The American Association of Obstetricians, Gynecologists and Abdominal Surgeons, and nine other societies. Editor: Geo. W. Kosmak, M.D.; Associate Editors: Howard C. Taylor, Jr., M.D., and Wm. J. Dieckmann, M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $12.00; Canada, and other Foreign Countries, $13.00 a year.

The Journal of Pediatrics

Borden S. Veeder, M.D., Editor.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

The Journal of Laboratory and Clinical Medicine

Carl V. Moore, M.D., Editor. Associate Editors: W. C. MacCarty, M.D.; T. B. Magath, M.D.; Victor C. Myers, Ph.D.; Edward Muntwyler, Ph.D.; George Herrmann, M.D.; Clifford J. Barborka, M.D.; Russell L. Haden, M.D.; John A. Kolmer, M.D.; M. H. Soule, Sc.D.; Paul R. Cannon, M.D.; Arnold D. Welch, Ph.D., M.D.; Frederick J. Stare, M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

American Journal of Syphilis, Gonorrhea and Venereal Diseases

J. E. Moore, M.D., Editor. Frank W. Reynolds, M.D., Associate Editor. Advisory Editorial Board: A. M. Chesney, M.D.; C. W. Clarke, M.D.; R. D. Herrold, M.D.; E. L. Keyes, M.D.; P. A. O'Leary, M.D.; T. Parran, M.D.; P. S. Pelouze, M.D.; J. H. Stokes, M.D.; R. A. Vonderlehr, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

The Journal of Thoracic Surgery

Representing The American Association for Thoracic Surgery. E. A. Graham, M.D., Editor; Brian Blades, M.D., and Richard H. Mead, Jr., M.D., Associate Editors.

Advisory Editorial Board: John Alexander, M.D.; Edward Wm. Archibald, M.D.; Edward D. Churchill, M.D.; Leo Eloesser, M.D.; Stuart W. Harrington, M.D.; Howard Lilienthal, M.D.; Rudolph Matas, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $10.50 a year.

American Heart Journal

A Journal for the study of circulation. Published monthly under the editorial direction of The American Heart Association. Editor-in-Chief, Thomas M. McMillan, M.D.; Associate Editors: Wallace M. Yater, M.D., Samuel Bellet, M.D., Louis Laplace, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $11.00 a year.

The Journal of Allergy

Official Organ of The American Academy of Allergy. H. L. Alexander, M.D., Editor. Editorial Board: J. H. Black, M.D.; M. B. Cohen, M.D.; R. A. Cooke, M.D.; S. M. Feinberg, M.D.; S. B. Hooker, M.D.; F. M. Rackemann, M.D.; M. B. Sulzberger, M.D.; L. Tuft, M.D.; M. Walzer, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

Surgery

Alton Ochsner, M.D., and Owen H. Wangensteen, M.D., Editors. Alfred Blalock, M.D., Associate Editor. Published monthly. Subscription rates: Domestic, $10; Canada, and other Foreign Countries, $11 a year.

☞ Enter your subscriptions to these important special journals today. If you prefer we shall be glad to send a sample copy.

THE C. V. MOSBY COMPANY — *Publishers* — St. Louis

"protein

Deficiency [in children] is much more common than is generally realized."*



Investigators have shown that when the variety of foods is limited – as in infant feeding – care must be exercised in their selection . . . the chief consideration being "the furnishing of the essential amino acids to be made available to the tissues by digestion."*

DRYCO, spray-dried for ready reconstitution in cold or warm water, provides the physician with a remarkably flexible basic high protein food, containing all the essential amino acids. It is ideally suited to the changing nutritional requirements of the normal or abnormal infant. Easily digestible (because of its soft curd characteristics), bacteriologically safe and constant in composition – this vitamin-fortified, improved, infant food may be readily adapted to six distinct types of formulas:

1. DRYCO alone *(high protein, low fat, low carbohydrate).*
2. DRYCO with carbohydrate *(high protein, low fat, high carbohydrate).*
3. DRYCO with whole milk—fresh, evaporated or dried *(high protein, intermediate fat, low carbohydrate).*
4. DRYCO with whole milk—fresh, evaporated or dried—and carbohydrate *(high protein, intermediate fat, high carbohydrate).*
5. DRYCO with skim milk—fresh or dried *(high protein, exceptionally low fat, low carbohydrate).*
6. DRYCO with skim milk—fresh or dried—and carbohydrate *(high protein, exceptionally low fat, high carbohydrate).*

*A.M.A. *Handbook of Nutrition, Chicago, 1943.*

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N. Y.

DRYCO is made from spray-dried, pasteurized, superior quality whole milk and skim milk, providing 2500 U.S.P. units of vitamin A and 400 U.S.P. units of vitamin D per reconstituted quart. Each tablespoon supplies 31½ calories. Dryco is available at all pharmacies in 1 and 2½ lb. cans.



DRYCO

the "Custom Formula" high protein infant food

THE JOURNAL OF PEDIATRICS

EDITOR

BORDEN S. VEEDER, M.D., 3720 Washington Blvd., St. Louis 8, Mo.

PUBLISHED BY THE C. V. MOSBY COMPANY, 3207 WASHINGTON BLVD.
ST. LOUIS 3, U. S. A.

Entered at the Post Office at St. Louis, Mo., as Second Class Matter.

Published Monthly, Subscriptions may begin at any time.

Editorial Communications

Original Communications.—Manuscripts for publication and correspondence relating to them should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo., U. S. A. Articles are accepted for publication upon the understanding that they are contributed solely to The Journal of Pediatrics.

Articles and Comments for the Department, The Social Aspects of Medicine.—All material for this section should be sent to Dr. Edwards A. Park, The Johns Hopkins Hospital, Baltimore 5, Md., U. S. A.

Manuscripts should be typewritten on one side of the paper only, with double spacing, and liberal margins. References should be placed at the end of the article and should include, in the order given, name of author, journal, volume, page and year; e.g., Smith: J. Pediat. 1: 10, 1932. Journal abbreviations as used in the publications of the American Medical Association should be followed. Illustrations accompanying manuscripts should be numbered, provided with suitable legends, and marked on margin or back with author's name. Articles accepted for publication are subject to editorial revision.

Neither the editors nor the publishers accept responsibility for the views and statements of authors as published in their "Original Communications."

Illustrations.—A reasonable number of half-tone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editor for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered only in India ink, or black typewriter ribbon (when the typewriter is used), as ordinary blue ink or colors will not reproduce. Only good photographic prints or drawings should be supplied for half-tone work.

Books for Review.—Only such books as are considered of interest and value to subscribers will be reviewed, and no published acknowledgment of books received will be made. These should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo.

Reprints.—Reprints of articles published among "Original Communications," must be ordered specifically, in separate communication to the publishers, The C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, U. S. A., who will send their schedule of prices. Individual reprints of an article must be obtained through the author.

Business Communications

Business Communications.—All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.

Subscription Rates.—Single copies, 75c. In the United States and other countries of the U. S. Postal Zone, $8.50 per year in advance. In Canada and other foreign countries $9.50.

Remittances.—Remittances for subscriptions should be made by check, draft, post-office or express money order, or registered letter, payable to the publishers, The C. V. Mosby Co.

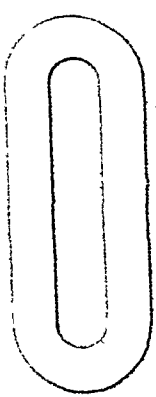
Change of Address.—The publishers should be advised of change of subscriber's address about fifteen days before the date of issue, with both new and old addresses given.

Advertisements.—Only articles of known scientific value will be given space. Forms close tenth of month preceding date of issue. Advertising rates and page sizes on application.

OTOLOGIC INFECTIONS

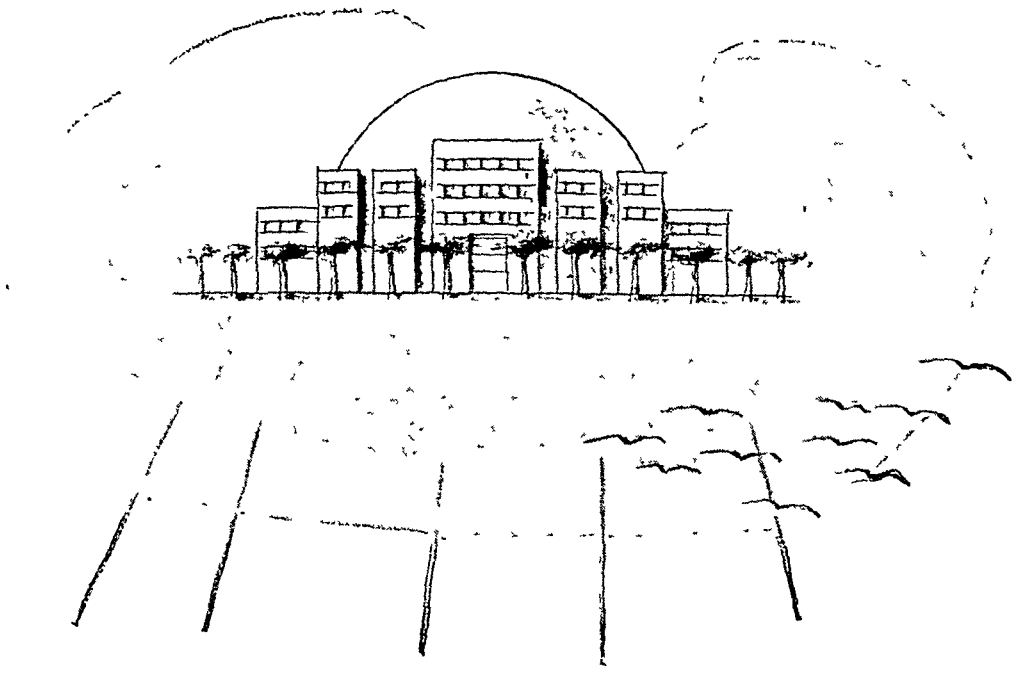
1. **ANALGESIC:** Prompt, effective—without impaired sulfonamide activity.
2. **WIDE FIELD:** Effective in BOTH acute AND chronic otitis media—fungicidal action in otomycotic infection.
3. **ADJUNCTIVE:** A valuable aid to systemic therapy—often reduces need for intensive systemic sulfa medication, thereby averting untoward or toxic reactions.
4. **HIGH DIFFUSION:** Penetrates infected tissues without harmful effects to living tissues.
5. **PHYSIOLOGICAL DEBRIDEMENT:** Promotes drainage and removal of necrotic debris.
6. **POTENTIATION:** Enhanced antibacterial potency.

White's Otomide is composed of 5% Sulfanilamide, 10% Urea (Carbamide) and 3% Anhydrous Chlorobutanol in a specially processed glycerin vehicle of unusually high hygroscopic activity. Supplied in dropper bottles of ½ fluid ounce (15 cc.)



tomide

TOPICAL OTOLOGIC CHEMOTHERAPY



Dream Hospital . . .

The hospital depicted here exists only in the hearts of men and women who are losing the grim battle with cancer. And in the imagination of other men and women who want desperately to provide a haven for these victims in need of hope and care to sustain them in the few months or years still remaining to them.

Actually, there is not a single such hospital anywhere devoted exclusively to these unfortunates who *may* be beyond the help of medical sciences, but who are still certainly in urgent need of hospital care. And only a limited, woefully insufficient number of beds available to them in other hospitals.

During the long years of the war we gave up our plans for the building of this dream hospital . . . Hope Institute.

But now we are more than ever determined to see it rise in stone and steel. A model hospital, the first of its kind . . . cheerful and comfortable in every way . . . with more the atmosphere of an apartment hotel than of a cold institution. Where the patients, depending upon their condition, can enjoy the warm hospitality of lounge and dining room, or retire to the merciful seclusion of a private room.

What do we need to build this hospital now? You. Every dollar or penny you can scrape together for it. Whether or not you know this tragedy from bitter personal experience . . . the tragedy of whole families, endlessly frustrated in their determination to care for a doomed member . . . give as generously as you can. Please fill out the coupon below and mail with your contribution. It will make this hospital more than a dream.

NCF

THE NATIONAL CANCER FOUNDATION
Griffin Building, 85 Franklin Street, New York 13, N. Y.

NAME _____

ADDRESS _____

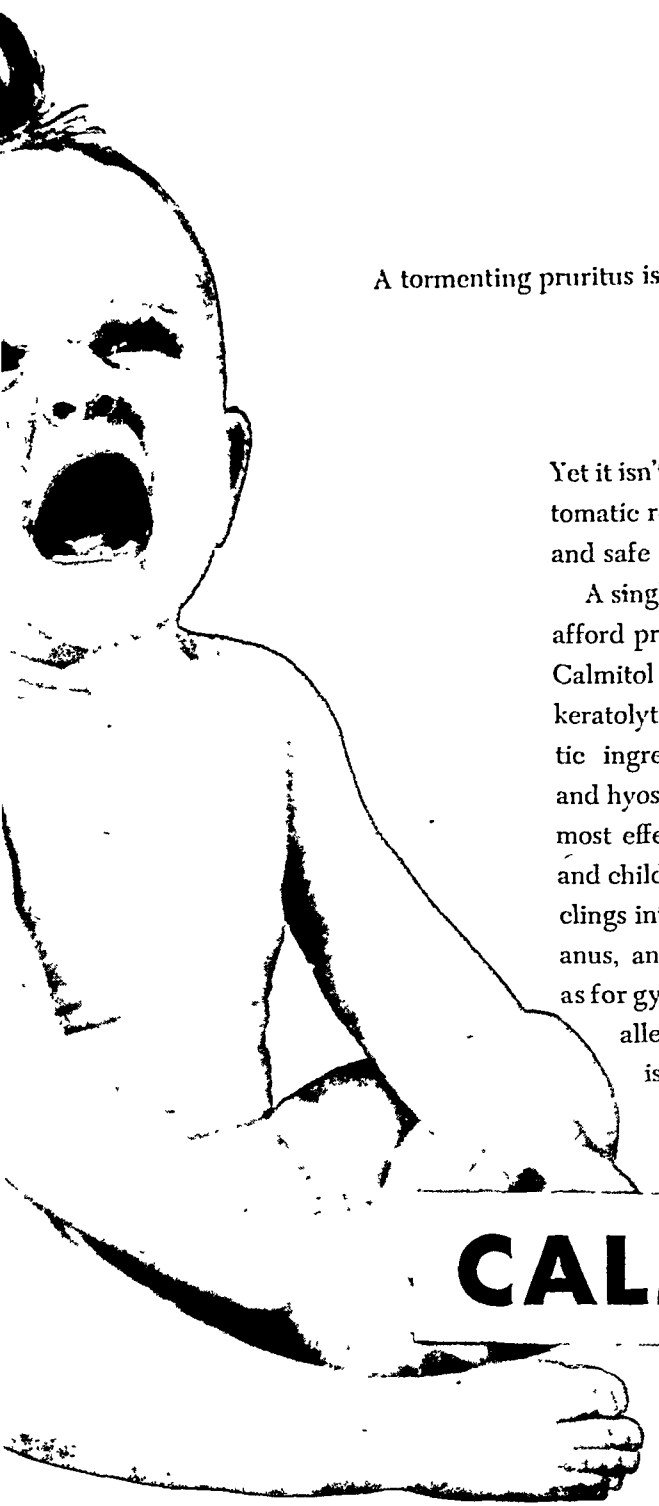
Make checks payable to Abbott Kimball, Treasurer of the National Cancer Foundation

THE NATIONAL CANCER FOUNDATION

Affiliated with

SPONSORS OF GOVERNMENT ACTION AGAINST CANCER

THE NATIONAL FOUNDATION FOR THE CARE OF ADVANCED CANCER PATIENTS



A tormenting pruritus is readily set off

Yet it isn't too hard to control for symptomatic relief can be singularly simple and safe with Calmitol Ointment.

A single application of Calmitol will afford prompt relief, lasting for hours. Calmitol contains no stimulating or keratolytic agents. Its active antipruritic ingredients, camphorated chloral and hyoscyamine oleate, are bland, yet most effective antipruritics for infants and children. Its unique emollient base clings intimately to axilla, groin, nates, anus, and genitalia. For pediatricians as for gynecologists, dermatologists, allergists, and internists—Calmitol is a first thought in pruritus.

CALMITOL

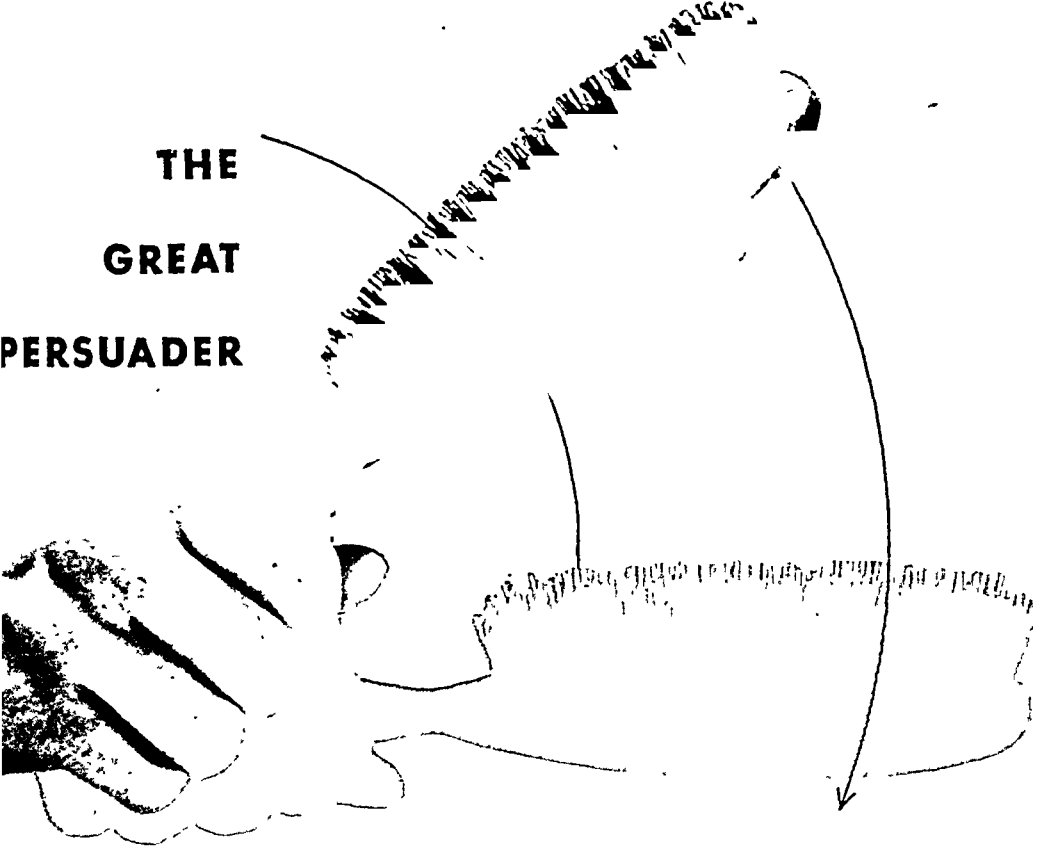
Thos. Leeming & Co. Inc.

155 E. 44th ST., NEW YORK 17, N. Y.



Pharmaceutical Manufacturers
Newark 7, N. J.

THE GREAT PERSUADER



All too often irate parents resort to a "good licking" for children who refuse to eat. The therapeutic merits of such a procedure are of course not medically recognized, since anorexia often is more than a stubborn personality defect.

More effective than punishment is the stimulation of B complex on appetite. 'Ryzamin-B' No. 2 has proved especially effective because of a pleasant taste-appeal which children relish. Containing the *natural* B complex as a concentrate of Oryza sativa (American rice) polishings, 'Ryzamin-B' No. 2 is also potently fortified with synthetic B factors. Children enjoy its rich, honey-like flavor any way it is given—right from its special measuring spoon, as a delicious spread with jam or peanut butter, or dissolved in milk, fruit juice and other beverages

'RYZAMIN-B' BRAND RICE POLISHINGS CONCENTRATE **NO. 2**

WITH ADDED THIAMINE HYDROCHLORIDE, RIBOFLAVIN AND NICOTINAMIDE

TUBES OF 2 OZ. AND BOTTLES OF 8 OZ.

'Ryzamin-B' registered trademark

BURROUGHS WELLCOME & CO (U.S.A.) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

PERIODICI SCIENTIFICI CAPPELLI, BOLOGNA

Ciascun Volume in abbonamento per l'Italia L. 800—Estero L. 1500

ANNALI ITALIANI DI CHIRURGIA
Diretto da R. Paolucci, A. M. Dogliotti, F. P. Tinozzi.

ANNALI DI RADIOLOGIA DIAGNOSTICA
Diretto da A. Rossi.

ARCHIVIO ITALIANO DI ANATOMIA E ISTOLOGIA PATOLOGICA
Diretto da A. Businco.

ARCHIVIO ITALIANO DI CHIRURGIA
Diretto da R. Paolucci, C. M. Fasiani, G. G. Forni, G. Fedeli.

ARCHIVIO ITALIANO DI DERMATOLOGIA, SIFILOGRAFIA E VENEREOLOGIA
Diretto dai Proff. G. Falchi, F. Flarer, L. Martinotti, E. G. Scolari.

ARCHIVIO ITALIANO DELLE MALATTIE DELL'APPARATO DIGERENTE
Diretto da C. Frugoni, G. M. Fasiani, E. Milani.

ARCHIVIO ITALIANO DI PEDIATRIA E PUERICOLTURA
Diretto da G. Frontali.

ARCHIVIO DI ORTOPEDIA
Diretto da A. Poli.

ARCHIVIO ITALIANO DI UROLOGIA
Diretto da L. Pisani.

ARCHIVIO DI PATOLOGIA E CLINICA MEDICA
Diretto da A. Gasbarrini, D. Cesa Bianchi, A. Dalla Volta, G. Sotgiu, L. Villa.

ARCHIVIO DI SCIENZE BIOLOGICHE
Diretto da G. Bergami, G. Quagliariello, S. Visco.

BOLLETTINO DI OCULISTICA
Diretto da V. Cavara.

LA CLINICA
Diretta da R. Paolucci, A. Gasbarrini.

ENDOCRINOLOGIA E SCIENZA DELLA COSTITUZIONE
Diretto da A. Gasbarrini, N. Pende.

L'OTO-RINO-LARINGOLOGIA ITALIANA
Diretto da P. Caliceti.

RIVISTA ITALIANA DI GINECOLOGIA
Diretta da G. Aymerich, L. Bacialli, C. Decio, G. Paroli, S. Scaglione.

Ciascun Volume in abbonamentoper l'Italia L. 1000—Estero L. 1800
CHIRURGIA DEGLI ORGANI DI MOVIMENTO
Diretto da F. Delitala.

Just Released

A New Mosby *Publication*

INFANT NUTRITION

by **PHILIP C. JEANS, M.D.**, Professor of Pediatrics, College of Medicine, State University of Iowa, and the late **WILLIAM McKIM MARRIOTT, M.D.**, Professor of Pediatrics, Washington University School of Medicine.

After a lapse of several years, this popular text returns to the Mosby list in a new, completely modern Fourth Edition.

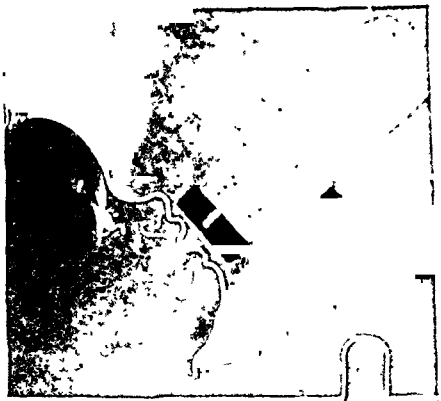
Dr. Jeans has revised the text thoroughly—overlooking none of the great strides made in the field of nutrition since publication of the last edition.

Changes and additions have been made in relation to Development; Minerals; the Vitamins and Infant Diseases. There is a comparative analysis of human and cows' milk, with discussion of artificial feeding.

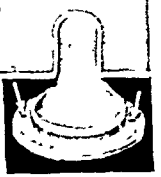
495 Pages 36 Illustrations Price $6.50

The C. V. MOSBY *Company*

SAINT LOUIS SAN FRANCISCO

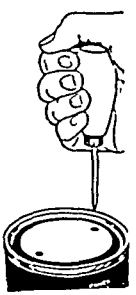


Importance of Bubbles



Evenflo air valves relieve vacuum, prevent collapse.

You hear a humming sound when baby is fed with an Evenflo Nurser. The humming comes from air bubbles entering bottle thru Evenflo's patented Twin Valve Nipple. This air relieves the vacuum caused by the withdrawal of food. It puts the same air pressure inside bottle as outside, thus preventing nipple collapse. Milk flows evenly when nursed. This smooth nursing action is why babies finish their Evenflo bottles easier and better.



Extra Air Hole Provides Even Flow.

Complete Evenflo Nursing Units, 4 or 8 oz. size, are 25c at baby shops, drug and dept. stores.

Evenflo

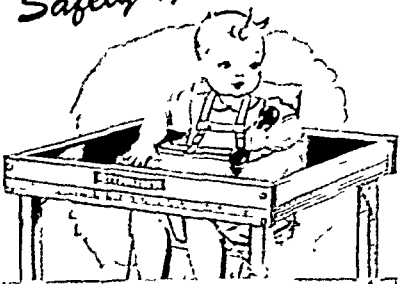
"America's Most Popular Nurser"

New 4 Oz. Hospital Size



Complete Unit—
Nipple, Bottle, Cap All-in-one, 25c

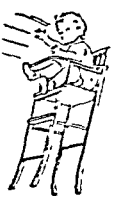
YOU CAN *Safely Recommend*



BABEE-TENDA*
TUMBLE-PROOF *Safety Chair*

More than half a million Mothers, and doctors and nurses by the thousands have used Babee-Tenda for their own babies. Child authorities endorse its many unique patented safety and training features:

1. SAFE FROM FALLS



Low, sturdy, well balanced, 25" square, 22" high, prevents disastrous high-chair spills. Non-collapsible legs. Safety halter holds securely, permits ample squirming-room.

2. AIDS DEVELOPMENT

Patented, self-adjusting back, seat and footrest aid posture, help develop back, foot and leg muscles. Suspended swing-action seat (well above floor drafts) affords restful comfort.

3. PROMOTES GOOD FEEDING HABITS

Eases mother's job at feeding time; removes child from emotional distractions of family dinner table; encourages self-feeding at baby's own table.

Sold only through authorized agencies (not in stores). Write for illustrated folder and prices. *Reg. U. S. Pat. Off.

BABEE-TENDA
Safety First and Always

THE BABEE-TENDA CORPORATION
Dept. JP-2, 750 Prospect Ave., Cleveland 15, Ohio
In Canada: 347 Bay Street, Toronto 1, Ont.

New! AN ENGLISH BOOK

For American Distribution

DISEASES of CHILDREN'S EYES

by JAMES HAMILTON DOGGART, Ophthalmic Surgeon, Hospital for Sick Children, Great Ormond Street, London; Surgeon and late Research Scholar, Royal London Ophthalmic Hospital.

288 pages, 210 illustrations, including 32 color plates. PRICE, $10.00.

After giving some sound, sensible advice about the care and examination of children's eyes, this new book gives a section of anatomy of the orbit, then discusses the eyeball, the eyelids, conjunctiva, etc. Excellent illustrations appear in these sections.

Separate chapters are written on the Visual Pathway; Development of the Eye; Congenital Abnormalities; Ocular Complications. Then treatment is taken up; with separate sections on injuries of the eyeball; diseases of the orbit; refraction; squint; lacrimal disorders; and the varied diseases associated with the eye. Every chapter is well illustrated, with both black and white and colored illustrations appearing in profusion.

This book will have a strong appeal if you are an Ophthalmologist, a Pediatrician or General Practitioner—for after all, it is the General Practitioner who is first consulted in children's cases.

Use Coupon to Order

THE C. V. MOSBY COMPANY MJ-9/47
3207 Washington Blvd.
St. Louis 3, Missouri

Gentlemen: Please send me a copy of Doggart's DISEASES OF CHILDREN'S EYES. The Price is $10.00

_____ Enclosed is check. _____ Charge my account

Name _____

Address _____

Nutritive Value

By LABORATORY DIGESTIBILITY TEST

"The first essential for a food to be considered of high nutritive value is that it be relatively completely digested and absorbed . . .

"Because of the increasing importance of margarine in the present-day diet, these results are now being reported . . .

"The average coefficient of digestibility of the seven experiments on margarine is 97, which is identical with the average obtained in the three tests on butter. . . There was no evidence of alteration in the absorption of other components of the diet with either diet. The subjects remained in normal health for the duration of the tests. These data indicate that from the standpoint of digestibility, margarine can be considered as containing a fat of high nutritive value."

—Excerpt from "Studies on the Comparative Nutritive Value of Fats; IX: The Digestibility of Margarine Fat in Human Subjects," by Harry J. Deuel, Jr., Dept. of Biochemistry and Nutrition, University of Southern California School of Medicine. Reported in the *Journal of Nutrition*, July 10, 1946, pp. 69-72.

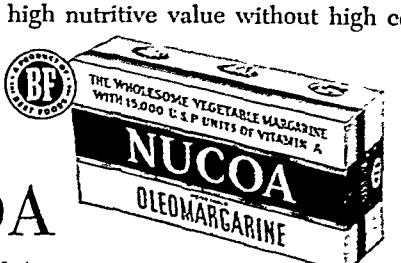
By HOMESPUN "TEST OF TIME"

Edith Bell, sixteen when the photograph below was taken, has been used to Nucoa in her diet since she was four years old. Her mother, Mrs. Fred Bell, is typical of millions of mothers who had discovered the goodness of Nucoa before wartime butter shortage introduced table use of margarine generally. For Nucoa set the standard for a fine margarine and won approval of homemakers and nutritionists years ago. It was the first margarine in America made with wholly domestic, pure vegetable oils, the first to add Vitamin A (1937), and first to guarantee 15,000 U.S.P. units of Vitamin A in every delicious pound.

Try Nucoa in your own home to convince yourself of its "melt-in-your-mouth" goodness. You'll have confidence then in recommending Nucoa where needed for high nutritive value without high cost.



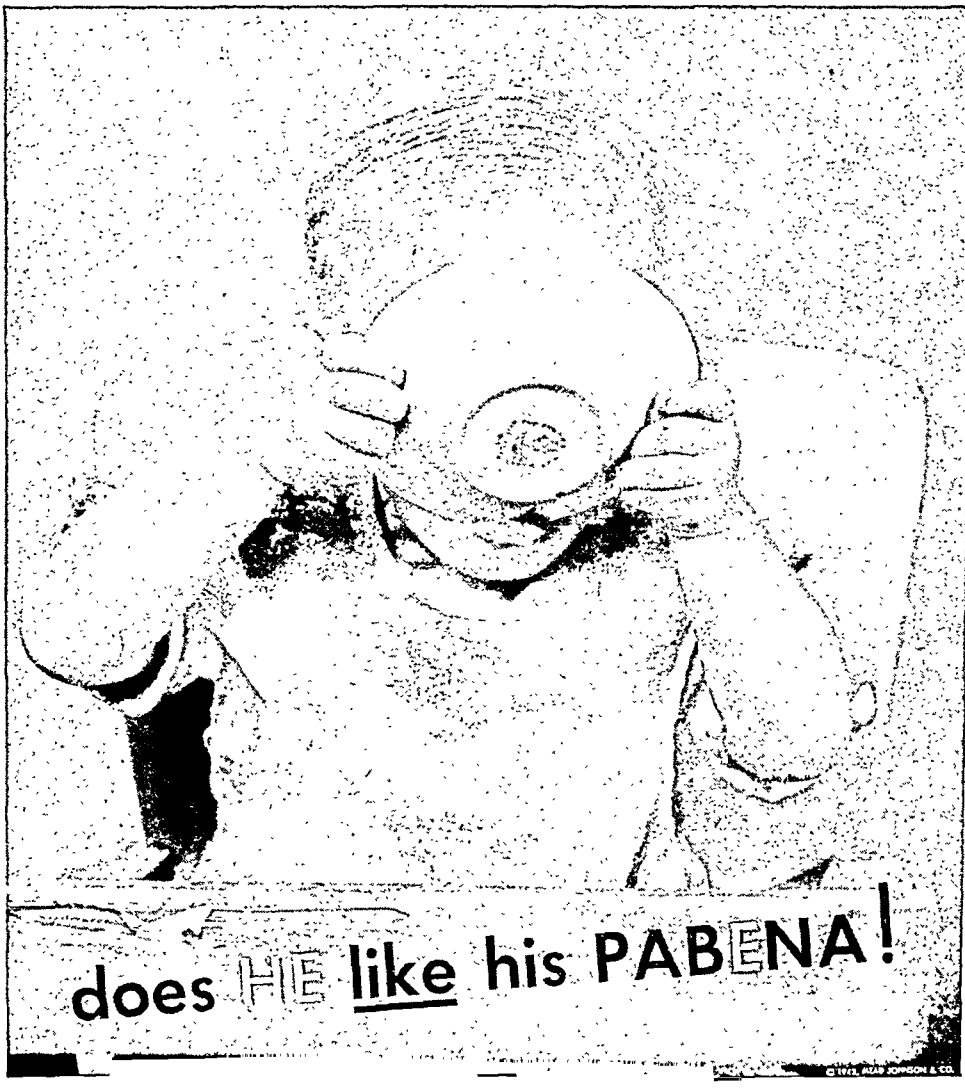
Edith Bell, a "bread 'n' Nucoa" girl for twelve of her sixteen years



Nutritious NUCOA

WITH 15,000 U.S.P. UNITS OF VITAMIN A

"NUCOA" REG. U. S. PAT. OFF.



WHEN interviewed between platefuls, this 11-months-old young man emphatically stated: "I have been brought up on Pablum and still like it, but some days when I'm in the mood for oatmeal, nothing satisfies me like Pabena!"

Nutritious, quick and easy to prepare, both products are for sale at drug stores.

MEAD JOHNSON & COMPANY, EVANSVILLE, IND., U.S.A.

HOW ABOUT CHECKING MY FEET TOO, DOCTOR?



STATISTICS show that the majority of babies are born with perfect feet. Just how long they remain that way depends upon the care they are given during that important period of development...*from start to six years old.* This means periodic check-ups during routine examinations and advice to mothers regarding the proper shoes.

SELF-STARTER Shoes are approved by leading Pediatricians because they incorporate the essential features which provide "Protected Foot Comfort."

Write for interesting leaflet, also name of nearest experienced fitter

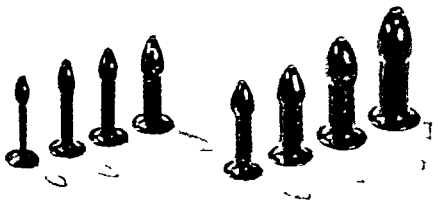
CARPENTER SHOE CO., ROCHESTER, N. Y.

Self-Starters
FROM START TO SIX YEARS OLD



In CONSTIPATION

YOUNG'S RECTAL DILATORS



CHILDREN'S
4 graduated sizes
0, 1, 1½, and 2

ADULT'S
4 graduated sizes
1, 2, 3 and 4

Used by the profession for more than 40 years, Young's Rectal Dilators provide anal dilitation and help to restore normal tone where tight or spastic rectal sphincter muscles have induced a constipated condition 15 to 30 minutes' daily use tends to promote habit time Sold only on R.

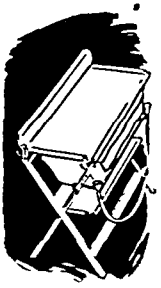
● Available at ethical drug stores or from your surgical supply house Write today for complete literature

F. E. YOUNG & COMPANY
434 E. 75th St. Chicago 19, Ill.

Help for new Mothers



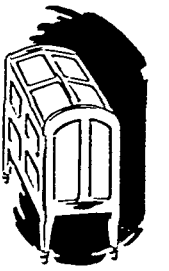
These three famous Trimble Nursery Necessities help mothers care for babies safely and with less effort.



KIDDIE-KOOP... the folding safety-screened crib for complete protection.

KIDDIE-BATH... makes baby bathing simple, safe.

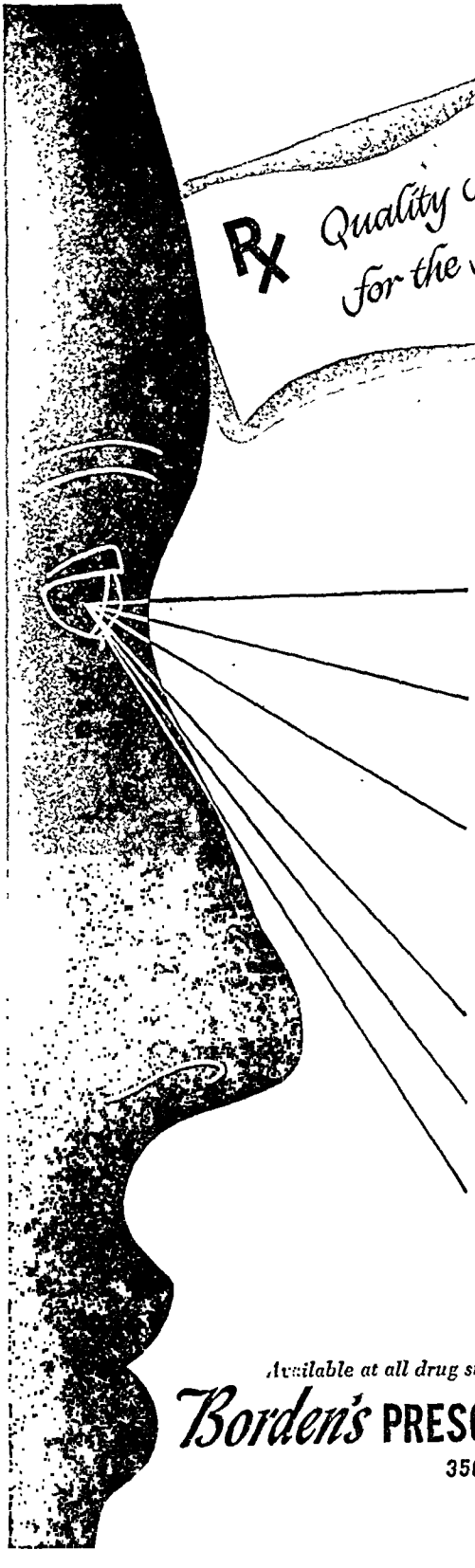
KIDDIE-TRAINER ...makes sound toilet training so easy.





Complete new helpful booklet "Making the World Safe for Baby," free for distribution to mothers. Write to Trimble, 90 Wren St, Pochester 13, N.Y.

Trimble
NURSERYLAND FURNITURE



Rx Quality Nutritional Preparations for the Physician's Prescription...

All prescriptions bearing the recognized name of "Borden" (pioneers in the field of nutrition) conform to the highest standards of biologic requirements, and are subject at all times to the most rigid controls of quality and purity.

for infants



BIOLAC — *a complete food* (when vitamin C only is added) — a contribution to optimum nutrition, because of high-protein, low fat, and added lactose content — reinforced with vitamins A, B_1, B_2 and D, and iron.



DRYCO — the *high protein food*, with intermediate carbohydrate content for formula flexibility, and low fat content — quickly soluble in cold or warm water.

for adults



GERILAC — a *powdered modified milk* for special dietary uses. A rich source of essential nutritive elements for pre- and postoperative cases, convalescence, pregnancy and lactation, soft and liquid diets, and for the aged. Palatable and easily digested; *only water required for dilution.*

for infants and adults



MULL-SOY — for your patients allergic to milk — a hypoallergenic soy concentrate with essential nutritional values of cow's milk; easily digestible, palatable, well-tolerated.



BETA LACTOSE — *milk's natural carbohydrate,* exceptionally palatable, highly soluble — for formula modification for infants, and corrective therapy in constipation in adults.



KLIM* — *spray-dried whole milk with soft curd properties,* invaluable when availability or safety of fresh milk is uncertain — readily soluble in cold or warm water. For infant feeding, and for peptic ulcer and other special adult diets.

**The nutritional statements of this advertisement are acceptable to the Council on Foods and Nutrition of the A.M.A.*

Available at all drug stores — complete information to physicians on request

Borden's PRESCRIPTION PRODUCTS DIVISION

350 MADISON AVENUE • NEW YORK 17, N. Y.

Announcing the availability of PERTUSSIS IMMUNE SERUM (*human*) IN VACUUM DRIED FORM

Once again we have Pertussis Immune Serum (human) *in the preferred* vacuum dried form. *Orders from physicians anywhere filled quickly. 24-hour service to handle telegraph orders. For literature and full information, write to:*

The **PHILADELPHIA SERUM EXCHANGE**

A NON-PROFIT ORGANIZATION

1740 Bainbridge Street
Philadelphia 46, Pa.

See the improved Hygeia Nursing Unit

- Easy to clean.
- Fewer parts to handle—just bottle, nipple and cap.
- When bottles are filled, only necessary to remove cap at feeding time.
- Sterilized cap makes handy container for baby's other foods.

CAP . . . Keeps nipple germ-free for storing or out-of-home feeding. Sterilized cap may be used for orange juice, cereals, etc.

NIPPLE . . . Famous breast-shaped nipple has a patented airvent to insure steady flow of formula and reduce "wind-sucking." Sanitary tab keeps nipple sterile when applying. *Not necessary to touch feeding surfaces of nipple.*

BOTTLE . . . Wide mouth—easy to clean—no funnel required for filling. Red measuring scale easy to read. Tapered shape makes it easier for baby to hold.

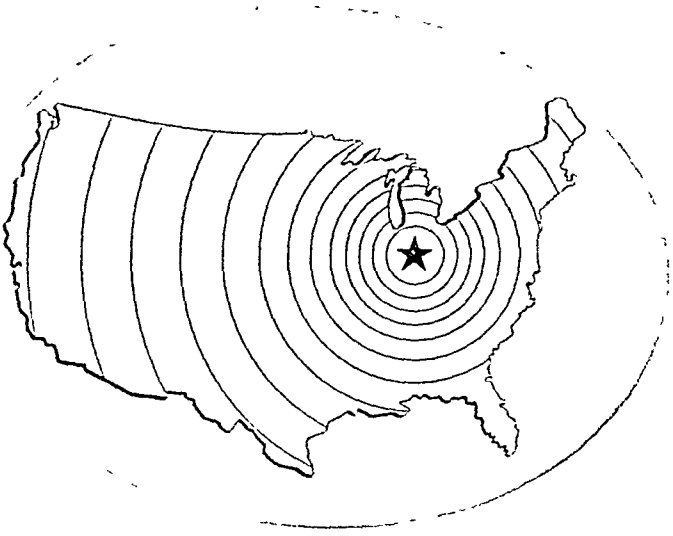
Sample free to doctors on request.
Sold by druggists everywhere.
Hygeia Nursing Bottle Co., Inc.
1210 Main St., Buffalo 9, N. Y.

AVAILABLE IN 4 OZ. AND 8 OZ. SIZES



All Hygeia national ads say:
"CONSULT YOUR DOCTOR REGULARLY"

HYGEIA NURSING BOTTLES NIPPLES WITH CAPS
Sold complete as illustrated, or parts separately



Pharmaceutical network

Lilly penicillin products are available to retail and hospital pharmacists from over two hundred service wholesalers located in every corner of the United States. No matter where you may be, Lilly penicillin products are near you. For quality and service, specify Penicillin, Lilly.

Penicillin

ELI LILLY AND COMPANY

INDIANAPOLIS 6, INDIANA, U.S.A.

Vol. 31, No. 4, October, 1947. The Journal of Pediatrics is published Monthly by The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo. Subscription price: United States, its possessions, Pan-American Countries, $8.50 a year; Canada, $10.00 (Canadian Currency); Foreign, $9.50. Entered as Second-Class Matter June 29, 1932, at the Post Office at St. Louis, Missouri, under the Act of March 3, 1879. Printed in the U. S. A.

POST-TONSILLECTOMY STATE . . .

TONSILLITIS . . . HEADACHE . . .

FEVER . . . COMMON COLD

From the wide use of Aspergum in painful throat conditions, there has developed considerable experience with this method of administering aspirin for its systemic effects.

For analgesia and antipyresis, the pleasant flavor and physical form of Aspergum appeal to childhood tastes which may object to other dosage forms.

Dillard's Aspergum contains 3½ grains of aspirin in a pleasantly flavored chewing gum base, readily acceptable even to the most sensitive tastes.

Ethically promoted—not advertised to the laity. In packages of 16 tablets and moisture-proof bottles of 36 and 250.

Dillard's

Aspergum

SALIVARY ANALGESIA-PLUS

How to Grow Bigger and Better Babies

(as observed by leading authorities)

EXCERPT:

INFANT NUTRITION

by

P. C. Jeans, A.B., M.D. and
Williams McKim Marriott, B.S., M.D.
4th Edition 1947, The C. V. Mosby Co., St. Louis

Comparison of recent tables with older studies shows that the average infant of today grows faster, both in length and weight, than the average baby of twenty years ago. Babies of healthy stock, given abundant food of *suitable* composition, are generally distinctly *heavier and larger* in all measurements than the accepted averages of the present day.—page 19.

EXCERPT:

SCIENTIFIC NUTRITION IN INFANCY AND EARLY CHILDHOOD

by

Stafford McLean, M.D. and Helen L. Fales, B.S.
Lea & Febiger, Philadelphia and New York

Whether nursed or artificially fed, infants who receive early additions of certain solids are, according to our observations, stronger and more active, they walk earlier, their fontanels close earlier, dentition is earlier, and they have better color and musculature than infants fed exclusively on milk mixtures up to the age of one year. They also seem less susceptible to infection.—page 171.

EXCERPT:

THE PRACTITIONERS LIBRARY OF MEDICINE & SURGERY

Vol. 7, D. Appleton-Century Co., Inc.

Many people have recently advocated beginning *solid food* at the age of six weeks or two months. Infants tolerate it well and *show large gains* during the early months. —page 194.



Here are body building solids ... in strained food form

Four Campbell's Baby Soups are balanced combinations of meat solids, vegetables, cereal. They provide all the meat... all the vegetables... a healthy baby requires. The fifth combines vegetables and cereal.

Smooth in texture, bland in flavor, babies accept these foods willingly from the very early months onward. Their daily use is a definite aid in building an optimum diet.

Feeding Suggestions: For the mid-forenoon meal, an egg accompanied by Campbell's Vegetable Baby Soup; and for the meat and vegetables in the noon and evening meals select one of Campbell's meat Baby Soups.

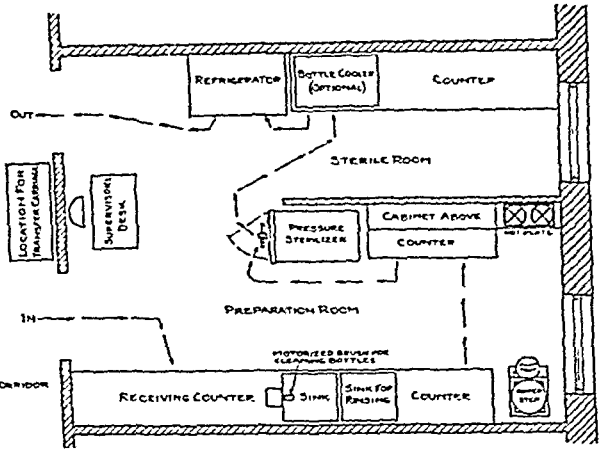
Dietetic analysis of these strained foods will be sent to any doctor upon request.

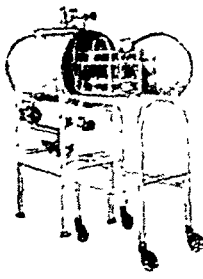
Every grocer who sells Campbell's Soups can supply Campbell's Baby Soups.



NOW! Aseptic Control of Milk Formula

WITH CASTLE'S ORIGINAL PRESSURE STERILIZER TECHNIC





The Castle Method of sterilizing and handling infant milk formula is based on scientific research . . . and has been proved in successful hospital practice.

Using a clean technic with TERMINAL STERILIZATION under pressure, the Castle Method is economical to set up and simple to operate in any hospital.

Send us a sketch showing dimensions of the room you have available for milk formula work. Our engineers will adapt it to the Castle Method . . . no obligation to you.—WILMOT CASTLE CO., 1268 University Avenue, Rochester 7, N. Y.

Castle LIGHTS AND STERILIZERS

Back copies wanted!

The publishers require copies of the following back issues of *The Journal of Pediatrics*, mostly for libraries, to complete broken files:

1940:	Jan., Feb.
1941:	Feb., Mar.
1942:	Jan., May, June
1943:	March, May, July, Sept.
1945:	Dec.
1946:	Jan., Feb., Apr., May
1947:	March

We will pay $0.85 for each copy

Address copies to: *A. W. Volland*, Circulation Manager, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Missouri.

THE SPASTIC CHILD

By MARGUERITE K. FISCHEL, 97 pages, 14 illustrations. PRICE, $1.50.

Mrs. Fischel's account of her work, her disappointments, and her ultimate success is written in an easy and informal style. Each step of her self-imposed task is described fully with illustrations to clarify the method of treatment. "The Spastic Child" is an interesting, informative, and, above all, encouraging story of a mother's experience in the field of a little understood disease. *The C. V. Mosby Co., Publishers, St. Louis 3, Mo.*

NEW YORK UNIVERSITY COLLEGE OF MEDICINE

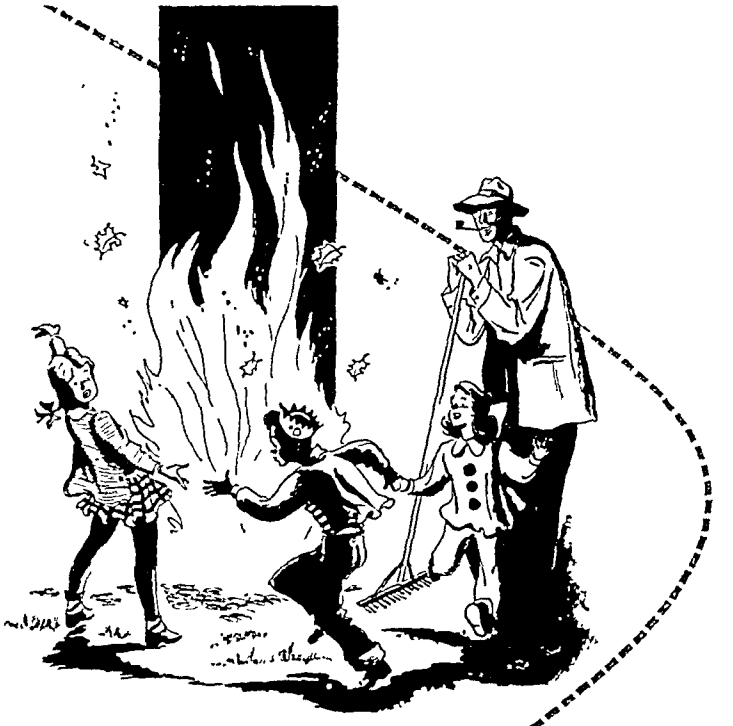
Graduate Course in Pediatrics

Full-time, 36 weeks' duration beginning [illegible] 1947; including [illegible] of children on [illegible] Service and Out-Patient Departments of Bellevue Hospital; problems of infant feeding and immunization; training in the basic sciences; seminars and conferences with DR. L. EMMETT HOLT and staff. Tuition—$600.00

Apply to the Director,

Postgraduate Division, New York University College of Medicine

477 First Ave., New York 16, N. Y.



Now . . . a brighter outlook for the child with petit mal

Tridione®

(Trimethadione, Abbott)

ABBOTT LABORATORIES
NORTH CHICAGO, ILLINOIS

No longer must the slow and uncertain processes of nature be depended on to bring relief to *petit mal* patients. Tridione—discovered and developed by Abbott Laboratories—offers the prospect of immediate improvement in the majority of cases. Here's further evidence added to the growing literature: In a recent investigation[1] Tridione was given to 166 patients suffering from *petit mal* (pyknoepilepsy), myoclonic jerks or akinetic seizures. None of the 166 had secured relief from any previous treatment. With Tridione, 31% became free of seizures; 32% had their seizures reduced by more than three-fourths; 20% improved to a lesser extent; 13% were unchanged, and only 4% became worse. *Thus 83% showed definite improvement.* In some cases the seizures *did not return* after Tridione was discontinued. Tridione has also been reported beneficial in certain cases exhibiting psychomotor seizures when combined with other anti-epileptic therapy.[2] Tridione is available through your pharmacy in 0.3-Gm. capsules and in pleasant-tasting aqueous solution containing 0.3 Gm. per fluidrachm. If you wish literature, just drop a line.

1. Lennox, W. G. (1947), Tridione in the Treatment of Epilepsy, J. Amer. Med Assn., 134:138, May 10. 2. DeJong, R. N. (1946), Further Observations on the Use of Tridione in the Control of Psychomotor Attacks, Am. J. Psychiat., 103:162, Sept.

INDEX TO ADVERTISERS

Please mention "The Journal of Pediatrics" when writing to our advertisers—It identifies you

Abbott Laboratories (Cecon) ---- 4
American Meat Institute (Meats) ---- 16
American Sterilizer Company (Milk Formula Laboratory Service) ---- 40
Arlington Chemical Company, The (Arlcaps) ---- 10
Armstrong Company, The Gordon (Baby Incubator) ---- 3
Articles to Appear in Early Issues ---- 64
Ayerst, McKenna & Harrison Limited (Enzifiur Lozenges) ---- 27

Babee-Tenda Corporation, The (Tumble-Proof Safety Chair) ---- 69
Back Copies Wanted ---- 70
Best Foods, Inc., The (Nucoa) ---- 71
Better Homes & Gardens (Baby Book) 14
Borden's Prescription Products (Dryco) 61
Borden's Prescription Products (Various) ---- Fourth Cover
Breck, Inc., John H. (Baby Breck Ointment) ---- 46
Bristol Laboratories, Inc. (Aminogran) 48
Burroughs Wellcome & Co. (U. S. A.) Inc. (Dexin) ---- 42
Burroughs Wellcome & Co. (U. S. A.) Inc. (Ryzamin B) ---- 67

Campbell Soup Company (Baby Soups) 2
Carnation Company (Evaporated Milk) 22
Carpenter Shoe Company (Self-Starters) 73
Castle Co., Wilmot (Lights and Sterilizers) ---- 70
Cereal Institute, Inc. (Cereals) ---- 21
Ciba Pharmaceutical Products, Inc. (Androgens) ---- 39
Clapp's Baby Cereals (Cereals) ---- 51
Commercial Solvents Corporation (Penicillin Troches) ---- 57
Corn Products Sales Company (Karo) - 32
Cutter Laboratories (Dermesthetic Ointment) ---- 60

Davol Rubber Company (Anti-Colic Brand Nipple) ---- 13
Doho Chemical Corporation (Auralgan and Otosmosan) ---- 31
Donley-Evans and Company (Gluco-Sulfonamides) ---- 11

General Electric X-Ray Corporation (Ultraviolet Lamp) ---- 9
Gerber Products Company (Baby Foods) 23
Glidden & Co., Inc., Otis E. (Zymenol) 35
Great Atlantic and Pacific Tea Company, The (White House Evaporated Milk) 25

Heinz Company, H. J. (Pineapple Rice Pudding) ---- 24
Hoffmann-La Roche, Inc. (Cal-C-Tose) 37
Hygeia Nursing Bottle Co., Inc. (Nursing Unit) ---- 75

International Pharmaceutical Corporation (Glycerite of Hydrogen Peroxide) ---- 44

Johnson & Johnson (Baby Lotion) ---- 5
Junket Folks, The (Rennet) ---- 15

Kinney & Sons, Inc., H. W. (Cartose) — 54

Lederle Laboratories, Inc. (Cerevim) ---- 33
Leeming & Co., Inc., Thos. (Calmitol) --- 65
Libby, McNeill & Libby, Inc. (Homogenized Baby Foods) ---- 43
Lilly and Company, Eli (Inhaler Tuamine) ---- Second Cover

M & R Dietetic Laboratories, Inc. (Similac) ---- 6
Marcelle Cosmetics, Inc. (Nail Lacquer) - 68
Mead Johnson & Company (Pabena and Pablum) ---- 82
Mead Johnson & Company (Dextri-Maltose) ---- 1
Merck & Co., Inc. (Crystalline Penicillin G Sodium) ---- 56
Merrell Company, The Wm. S. (Infa-Concemin) ---- 17

National Cancer Foundation ---- 74
National Dairy Products Company, Inc. (Formulac) ---- 45
National Drug Company, The (Diphtheria-Tetanus-Pertussis Combined) ---- 47
Nepera Chemical Co., Inc. (Mandelamine) 34
Nestle's Milk Products, Inc. (Evaporated Milk) ---- 50
New York University College of Medicine 79

Parke, Davis & Company (Benadryl Hydrochloride) ---- 7
Periodici Scientifici Cappelli, Bologna --- 78
Pet Milk Company (Evaporated Milk) -- 55
Philadelphia Serum Exchange, The (Pertussis Immune Serum—Human) ---- 75
Pyramid Rubber Co., The (Evenflo Nurser) ---- 69

Ralston Purina Company (Ralston) ---- 36
Robins Company, Inc., A. H. (Donnatal Elixir) ---- 52, 53

Schenley Laboratories, Inc. (Penicillin) - 30
Smith, Kline & French Laboratories, Inc. (Benzadrine Inhaler) ---- 59
Smith, Kline & French Laboratories, Inc. (Pragmatar) ---- 26
Squibb & Sons, E. R. (Diphtheria and Tetanus Toxoids) ---- 58
Staley Mfg. Co., A. E. (Sweetose) ---- 8
Stearns & Company, Frederick (Fergon) - 19
Swift & Company (Strained and Diced Meats) ---- 41

Trimble (Nurseryland Furniture) ---- 73

Vaisey-Bristol Shoe Co., Inc. (Jumping-Jacks) ---- 66

Wander Company, The (Ovaltine) ---- 38
Westwood Pharmacal Corp. (Lowila) ---- 18
White Laboratories, Inc. (Dillard's Aspergum) ---- 76, 77
White Laboratories, Inc. (Multi-Beta Liquid) ---- 28, 29
White Laboratories, Inc. (Otomide) — 62, 63
Winthrop Chemical Company, Inc. (Drisdol) ---- 12
Wisconsin Alumni Research Foundation (Foundation Seal) ---- 49
Wyeth Incorporated (Antipertussis Serum) 20

Young & Co., F. E. (Dilators) ---- 73

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.



the boy with the "hollow legs"

Periods of rapid growth and heightened metabolism call for *intensified* antirachitic therapy. White's Cod Liver Oil Concentrate *Tablets* provide the wholly *natural* vitamins A and D—in so pleasant tasting a form that even finicky young patients gladly cooperate.

White Laboratories, Inc., Newark 7, N. J.

CONTENTS FOR SEPTEMBER, 1947

Original Communications

Combined Immunization Against Diphtheria, Tetanus, and Pertussis in Children Over Three Months of Age; Including an Evaluation of the Effectiveness of Two Immunizing Agents. Paul A. di Sant' Agnese, M.D., New York, N. Y. ---- 251

Myocardial Infarction in the Newborn Infant. Robert M. Ravich, M.D., and Philip Rosenblatt, M.D., Brooklyn, N. Y. ---- 266

Treatment of Diabetic Acidosis. Alexis F. Hartmann, M.D., and Jane Erganian, M.D., St. Louis, Mo. ---- 274

Stuttering, A Reorientation. W. Hugh Missildine, M.D., and Philip J. Glasner, Baltimore, Md. ---- 300

Epidemiologic Studies in Dental Caries. II. The Incidence of Caries Among Institutionalized Children. Julian D. Boyd, M.D., and Virgil D. Cheyne, D.D.S., Iowa City, Iowa ---- 306

Sydenham's Chorea, A Syndrome for Differential Diagnosis. B. M. Kagan, M.D., and B. Mirman, M.D., Chicago, Ill. ---- 322

A Comparison of Vitamin C in Mothers and Their Premature Newborn Infants. Lawrence B. Slobody, M.D., Reuel A. Benson, M.D., and Joan Mestern. New York, N. Y. ---- 333

Psychiatric Services in a Children's Hospital. S. A. Szurek, M.D., San Francisco, Calif. ---- 338

Case Reports

Abdominal Abscess as a Cause of Intestinal Obstruction in the Newborn Infant. Julius B. Richmond, M.D., and Herbert R. Moore, M.D., Chicago, Ill. ---- 343

Cooley's Erythroblastic Anemia in Two Chinese Boys. Luther B. Gardner, M.D., New York, N. Y. ---- 347

Hypersensitivity to Privine. Jacob Greenblatt, M.D., Stamford, Conn. 355

The Social Aspects of Medicine

Letter of Dr. Joseph Palma ---- 357

Letter of Dr. James L. Wilson ---- 359

Testimony of Dr. R. M. Atwater on Senate Bill 545 ---- 361

News and Notes

News and Notes ---- 364

Book Reviews

Medicine in the Changing Order ---- 365

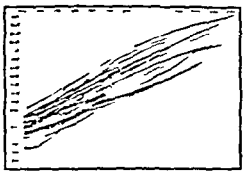
Mothers APPRECIATE THE SIMPLICITY OF PREPARING FEEDINGS



The preparation of Similac feedings requires only the addition of Similac powder to previously boiled, tepid water—in the proportions you prescribe. Mixing requires only 20 to 30 seconds. The simpler your directions to the mother, the less chance of error on her part. And simpler procedure in preparing feedings makes sanitation easier.

Physicians LIKE THE UNIFORM RESULTS

Similac is simple to prepare . . . Modern . . . Ethical. It gives uniformly good results.



ACCEPTED AMERICAN MEDICAL ASSN.

A powdered, modified milk product, especially prepared for infant feeding, made from tuberculin tested cow's milk (casein modified) from which part of the butter fat has been removed and to which has been added lactose, cocoanut oil, cocoa butter, corn oil, and olive oil. Each quart of normal dilution Similac contains approximately 400 U S P units of Vitamin D and 2500 U S P. units of Vitamin A as a result of the addition of fish liver oil concentrate



SIMILAC *Similar to breast milk*

M & R DIETETIC LABORATORIES, INC. • COLUMBUS 16, OHIO

Vol. 31 OCTOBER, 1947 No. 4

THE JOURNAL OF PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE PROBLEMS AND DISEASES OF INFANCY AND CHILDHOOD

BORDEN S. VEEDER
St. Louis
Editor

CHILD HEALTH CENTER
UNIVERSITY OF WASHINGTON

Published by THE C. V. MOSBY COMPANY, 3207 Washington Blvd., St. Louis 3, U.S.A.
Copyright 1947 By The C. V. Mosby Company

Table of Contents on 3rd Cover

Sweetose*

—a major improvement in corn syrup

—IDEAL CARBOHYDRATE FOR INFANT FEEDING

Sweetose offers many decided advantages both to the physician and to the mother over traditional corn syrups. Made from corn, Sweetose is made under the new acid-enzyme process. The result is a completely new type of corn syrup:





WRITE FOR FURTHER DETAILS

A. E. Staley Mfg. Co.

Box 1091, Decatur, Illinois

Sweetose contains considerably more dextrose and maltose than the older-type corn syrups.

Sweetose is well-tolerated, easily digested and absorbed. The possibility of gastrointestinal upset is minimized.

Sweetose is pasteurized.

Sweetose is easy to use in formulas. Since it has a low viscosity, it will dissolve readily in milk or water at refrigerator temperatures, and thus avoids the stimulation of bacterial growth.

	Representative Analysis of Sweetose White Syrup	Representative Analysis of Ordinary Corn Syrup
Moisture	25.2	26.6
Dextrose	28.0	14.7
Maltose	25.5	13.9
Higher Sugars	12.0	13.6
Dextrines	9.1	24.8
Sucrose	0.0	6.2
Ash	0.2	0.2
Available Carbohydrates	74.6	73.2
Calories per fluid oz	120.0	118.5

No added flavoring or salt.

*Sweetose is a trade-mark of the A. E. Staley Mfg. Co., Decatur, Illinois, registered in the U. S. Patent Office.

BRIEF HISTORICAL NOTES ON MEAD'S CEREAL, PABLUM AND PABENA

HAND in hand with pediatric progress, the introduction of Mead's Cereal in 1930 marked a new concept in the function of cereals in the child's dietary. For 150 years before that, since the days of "pap" and "panada," there had been no noteworthy improvement in the nutritive quality of cereals for infant feeding. Cereals were fed principally for their carbohydrate content.

The formula of Mead's Cereal was designed to supplement the baby's diet in minerals and vitamins, especially iron and thiamine. How well it has succeeded in these functions may be seen from two examples:

(1) As little as one-sixth ounce of Mead's Cereal* supplies over 50% of the iron and 20% of the thiamine minimum requirements of the 3-months-old infant. (2) One-half ounce of Mead's Cereal furnishes all of the iron and 60% of the thiamine minimum requirements of the 6-months-old baby.

That the medical profession has recognized the importance of this contribution is indicated by the fact that cereal is now routinely included in the infant's diet as early as the third or fourth month instead of at the sixth to twelfth month as was the custom only a decade or two ago.

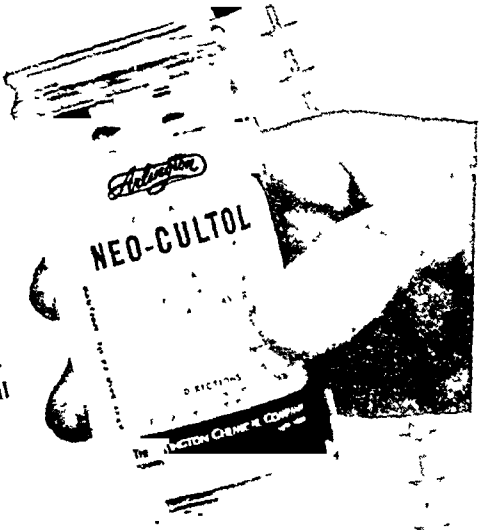
In 1933 Mead Johnson & Company went a step further, improving the Mead's Cereal mixture by a special process of cooking, which rendered it easily tolerated by the infant and at the same time did away with the need for prolonged cereal cooking in the home. The result is Pablum, an original product which offers all of the nutritional qualities of Mead's Cereal, plus the convenience of thorough scientific cooking.

During the last twelve years, these products have been used in a great deal of clinical investigation of various aspects of nutrition, which have been reported in the scientific literature.

Many physicians recognize the pioneer efforts on the part of Mead Johnson & Company by specifying Mead's Cereal and PABLUM—and also the new Pablum-like oatmeal cereal known as PABENA.

*Pablum, the precooked form of Mead's Cereal, has practically the same composition: wheatmeal (farina), oatmeal, cornmeal, wheat embryo, beef bone, brewers yeast, alfalfa leaf, sodium chloride, and reduced iron. Mead Johnson & Co., Evansville 21, Indiana, U.S.A.

NATURAL CORRECTIVE



NEO-CULTOL* gently corrects constipation by inducing restoration of a normal intestinal flora. It implants a viable culture of Lactobacillus acidophilus . . . counteracts putrefactive processes . . . avoids formation of the "cathartic habit" with its harmful sequelae, such as griping, flatulence, diarrheic movements . . . and constipational "rebound".

- GENTLY LUBRICATING
- PALATABLE
- NON-HABIT-FORMING
- MELTING POINT ADJUSTED TO PREVENT LEAKAGE

NEO-CULTOL

REG U S PAT OFF

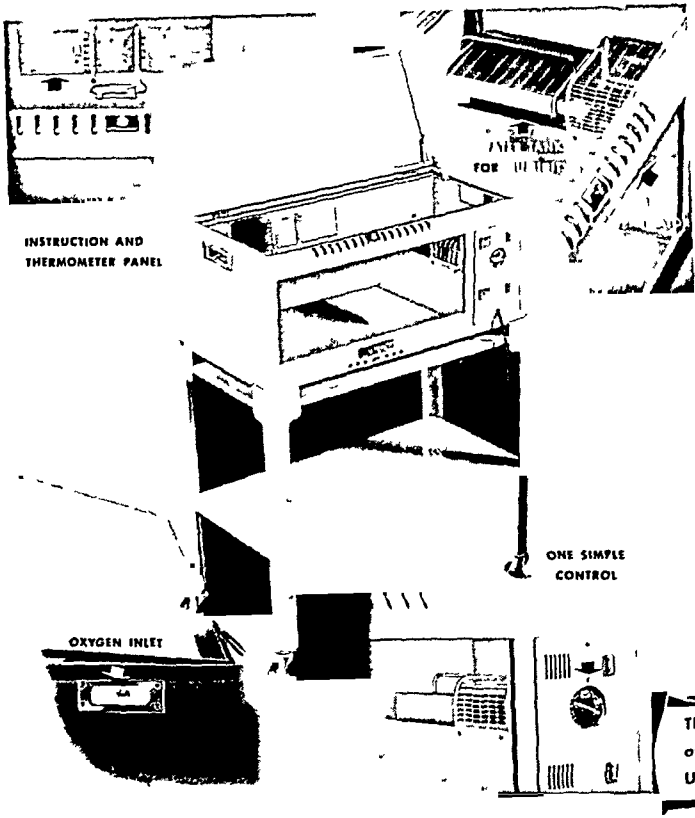
Lactobacillus acidophilus
in a Refined Mineral Oil Jelly
Chocolate Flavored

THE ARLINGTON CHEMICAL COMPANY
YONKERS 1. Arlington NEW YORK

SUPPLIED: In jars containing 6 oz.

*The word NEO-CULTOL is a registered trademark of The Arlington Chemical Company.

ARMSTRONG X-4 PORTABLE BABY INCUBATOR



1. Low cost
2. Underwriter approved
3. Simple to operate
4. Only 1 control dial
5. Safe, low-cost, heat
6. Easy to clean
7. Quiet and easy to move
8. Ball-bearing, soft rubber casters
9. Fireproof construction
10. Excellent oxygen tent
11. Welded steel construction
12. 3-ply safety glass
13. Full length view of baby
14. Simple outside oxygen connection
15. Night light over control
16. Both F. and C. thermometer scales
17. Safe locking ventilator
18. Low operating cost
19. Automatic control
20. No special service parts
21. Lid locks open

The Armstrong X-4 Baby Incubator is the only Baby Incubator tested and approved by Underwriters' Laboratories for use with oxygen

● In offering you the Armstrong X-4 Portable Baby Incubator we stand firmly on the principle that we must provide a SAFE Baby Incubator, a LOW COST Baby Incubator and a SIMPLE Baby Incubator.

That we have succeeded is evidenced by the fact that to date close to 400 Hospitals have placed voluntary repeat orders for more than 1200 additional Incubators. More and more it is being used, not only for the premature baby, but for any debilitated or under weight baby.

THE GORDON ARMSTRONG COMPANY

Division PPI • Bulkley Building • Cleveland 15, Ohio

Distributed in Canada by INGRAM & BELL, LTD. • TORONTO • MONTREAL • WINNIPEG • CALGARY • VANCOUVER

Export Distribution by GENERAL ELECTRIC MEDICAL PRODUCTS CO. • CHICAGO 3, ILLINOIS





HUNGRY, HEALTHY, HAPPY Infa-Concemin Kids









Too young to be impressed by the fact that it's good for them, infants and children take Infa-Concemin because it tastes good. They like it! Infa-Concemin is the *one* B complex-iron concentrate designed specifically for small patients. It combines: (1) pleasant taste, (2) the *whole* B complex, (3) an adequate hematinic, and (4) concentrated drop dosage.

....INFA-CONCEMIN..... A MERRELL PEDIATRIC SPECIALTY...

Vitamin B Complex with Ferrous Sulfate

Each 1 cc. contains:

Thiamine hydrochloride	0.8 mg
Riboflavin	0.8 mg
Niacinamide	5.0 mg
Pyridoxine hydrochloride	0.5 mg
Liver, B complex fraction	67.5 mg.
Rice bran extract	67.5 mg.
Ferrous sulfate	37.5 mg

Indications

Deficiency states associated with anorexia—malnutrition—restricted growth—irritability, as a tonic in post-sulfonamide debilitation and recuperative phases of severe respiratory infections

Average dose 1 to 3 cc daily (20 to 60 drops from dropper enclosed in package) in milk, fruit juice or directly into the mouth. Available in 30 cc dropper bottles and 8 oz bottles



Trademark Infa-Concemin Reg U S Pat Off

MERRELL 1828

THE WM. S. MERRELL COMPANY · CINCINNATI, U.S.A.



'ry the
tenth
velfth
day
of life...

"...vitamin D
in a
ncentrated form
ld be started."[1]

White's Cod Liver Oil Concentrate *Liquid* provides the wholly *natural* vitamins A and D derived exclusively from time-proved cod liver oil itself—the standard by which all antirachitic agents are measured. In liquid form for drop dosage to infants—convenient, palatable, economical.

1. Anderson, N. A.: Penn. Med. J., *48*:566-8 (Mar.) 1945

White Laboratories, Inc., Newark 7, N. J.

Announcing—

T-BARDRIN

(ANGIER)

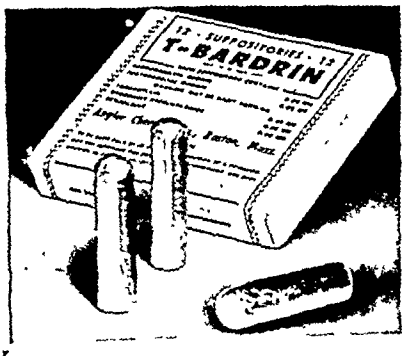
For faster, more prolonged relief in a greater percentage of Asthmatic and Hay Fever cases.

In rectal suppository form, T-BARDRIN uniquely combines ephedrine and theophylline with adequate sedation to provide both prompt and prolonged relief in cases where cardiac involvements are not a consideration.

Due to a synergistic action of multiple barbiturates, T-BARDRIN supplies the rapid and sustained sedative action so important in the treatment of *both asthmatic and hay fever patients.* As T-BARDRIN may be self-administered in accordance with prescribed routine, emergency and night calls are virtually eliminated.

CLINICAL STUDIES RECENTLY REPORTED EVIDENCE THE EFFICACY OF T-BARDRIN

	No. of CASES	RELIEF REPORTED				SYMPTOM FREE PERIOD (Hours)				INITIAL ACTION (Minutes)			REACTIONS
		MARKED	MODERATE	SLIGHT	NONE	8	16	24	36+	5	10	15	
ADULTS (all asthma)	42	30	2	1	9	4	10	16	3	5	25	3	2
CHILDREN 14 yrs. and under—60% Hay Fever, 40% Asthma	65	58	3		4				61	58	3		NONE



Samples and further information furnished when requested on professional letterhead.

FORMULA

Each T-BARDRIN suppository contains:

Pentobarbital sodium	0.05 gm.
Phenobarbital sodium	0.05 gm.
Theophylline	0.40 gm.
Ephedrine hydrochloride	0.05 gm.
Benzocaine	0.06 gm.

in a cocoa butter base.

(Available in boxes of 12 suppositories)

WARNING: May be habit-forming

ANGIER CHEMICAL COMPANY

Boston 34, Massachusetts

The Doctors' Album of New Mothers

No. 20: MALADJUSTED MRS. MALLOY



Mrs. Malloy never could adjust herself easily to new people, their ways and whims. So, naturally, she was perplexed by the activities of her new *son!*

Every ill-timed bellow he came forth with, every uncooperative wiggle he indulged in—smote poor Mrs. Malloy as a personal affront.



But the worst was yet to come! For one day Baby Malloy broke out with groups of little pink polka dots! What to do? What to do?



Luckily for Mrs. Malloy. her kind and understanding doctor knew that new mothers quite often become unnerved by little skin irritations so common to babies.

So he calmly recommended regular dustings with Johnson's Baby Powder—as so many doctors do.

Johnson's is made of superfine talc...helps prevent annoying prickly heat and chafing.

More doctors, nurses, and hospitals recommend Johnson's than all other brands of baby powder put together.



JOHNSON'S BABY POWDER

Johnson & Johnson



TO THE MOTHERS WHO SAY, "MY CHILD WON'T EAT VEGETABLES!"



RECOMMEND DELICIOUS KNOX DISHES MADE WITH VEGETABLES!

To paraphrase an old adage, "You can lead a child to a vegetable, but you can't make him eat!" That's why so *many* doctors recommend vegetable dishes made with Knox Gelatine. You see, Knox dresses up vitamin-rich vegetables in such a delicious fashion children will eat them right down to the last bite!

Next time a mother poses this problem, give her the new Knox Gelatine booklet "Knox Recipes Children Love." We'd be delighted to send you as many copies as you can use.
Write to Knox Gelatine, Dept. 459, Johnstown, N. Y.

KNOX GELATINE ALL PROTEIN, NO SUGAR



ABDEC DROPS

mean "right foot forward" . . .

Starting life on the right foot, nutritionally speaking, contributes materially to normal, unimpeded infant growth and development. With ABDEC DROPS, the physician can place in the hands of the mother the means of assuring her that her infant will receive an adequate supply of essential vitamins and a healthier nutritional status.

ABDEC DROPS join fat and water-soluble vitamins—A, B_1, B_2, B_6, C, D, sodium pantothenate and nicotinamide—into *one* highly concentrated solution that may be administered directly or added to foods. ABDEC DROPS are one of a long line of Parke-Davis preparations whose service to the profession created a dependable symbol of significance in medical therapeutics—

MEDICAMENTA VERA.



ABDEC DROPS may be administered directly or may be added to formula or other food without appreciably altering taste or appearance. Included in each package is a dropper graduated at 0.3 cc (daily dose for infants under one year) and 0.6 cc (daily dose for older children and adults).

Each 0.6 cc represents	
Vitamin A	5000 units
Vitamin D	1000 units
Vitamin B_1 (Thiamine Hydrochloride)	1 mg.
Vitamin B_2 (Riboflavin)	0.4 mg.
Vitamin B_6 (Pyridoxine Hydrochloride)	1 mg.
Pantothenic Acid (as the sodium salt)	2 mg.
Nicotinamide	5 mg.
Vitamin C (Ascorbic Acid)	50 mg.

PARKE, DAVIS & COMPANY · DETROIT 32, MICHIGAN

MEDICAMENTA VERA · P CO.

when common sense says

OMIT SOAP



In INFANTILE ECZEMAS and DIAPER RASH

TO AVOID EXACERBATION

of infantile eczemas and diaper rash which may occur with soap, and to help prevent these conditions in sensitive babies . . .

USE LoWILA

COMPLETELY SOAPLESS, GENTLE, EFFICIENT SKIN CLEANSER

LoWILA provides a completely soapless, non-irritant skin cleansing regime; good lather, pH about that of normal skin.

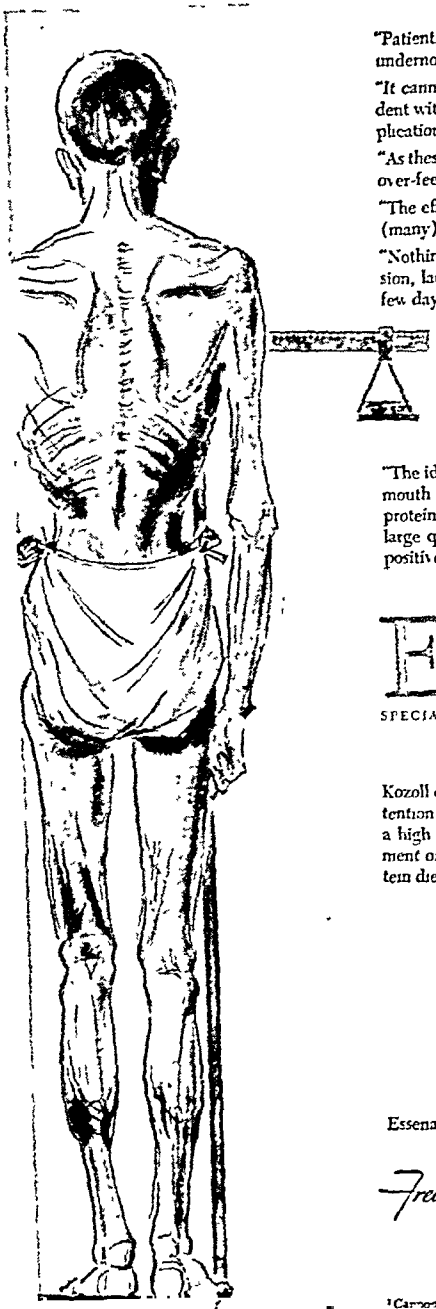
LoWILA Cake superbly mild, no alkali, less slippery allowing firmer hold on baby in bath. Economical.

LoWILA Liquid washes diapers beautifully, gently, without the irritating residue left by soaps. A little goes a long way.

LoWILA is kind to mother's skin too!

Westwood PHARMACAL CORP.
468 DEWITT ST., BUFFALO 13, N.Y.

WRITE FOR SAMPLE AND LITERATURE



"Patients afflicted with chronic maladies...become increasingly undernourished as the disease progresses."[1]

"It cannot be over-emphasized that malnutrition exists coincident with a primary disease, that malnutrition is a serious complication and is amenable to therapy."[2]

"As these patients are in such great need of protein, a therapy of over-feeding is indicated."[2]

"The effect of protein hyperalimentation is truly remarkable in (many) conditions."[3]

"Nothing is as striking as to see these symptoms (mental depression, lack of appetite, weakness and lassitude) disappear in a few days of a regimen of 'hyperalimentation'."[3]

"The ideal high protein therapy in patients able to take food by mouth is the oral administration of a palatable, easily digested protein or protein derivative capable of being incorporated in large quantities in the common foods and of producing large positive nitrogen balances."[3]

Essenamine®

SPECIALLY PROCESSED PROTEIN • DERIVED FROM LACTALBUMIN

For Oral Protein Therapy

Kozoll et al[3] who observed a percentile increase in nitrogen retention from 11 per cent on a low protein diet to 43 per cent on a high protein diet state that their "success with the employment of Essenamine as the principal ingredient of a high protein diet was probably due to four factors:

(1) "*its high concentration of protein;*

(2) "*its high content of essential amino acids*, that is, its high biologic value;

(3) "*its lack of any pronounced taste*, so that it can be incorporated in large quantities in other foods that have a pleasant taste,

(4) "*its limited solubility*...(which) apparently minimized the concentration of amino acids in the small intestine at any one time, so that the sense of fulness was postponed and the tendency to diarrhea...did not occur."

Essenamine is supplied in 7½ and 14 oz. wide-mouth jars.

Frederick Stearns & Company

Division DETROIT 31, MICHIGAN

[1] Carman. Some Pathologic Aspects of Undernutrition. Proc. Inst. Med. Chicago 15 20, 1944
[2] Spies. Malnutrition. M. Clin. North America 30 563, 1946
[3] Kozoll, Hoffman, Meyer and Garvin. High Protein Therapy. Arch. Surg. 53 653, 1946

Trade Mark Essenamine Reg. U. S. Pat. Off.



what does S-M-A stand for?

For years physicians have amused themselves speculating. "Same as *Ma's*", says one. "*S'mazing*", guesses another.

Actually the letters S-M-A originated in a laboratory and are used instead of other symbols to identify Wyeth's Food Formula for Infants.

In developing S-M-A, the basic cow's milk was *adapted in character* where it deviates from human milk—not merely juggled as to relative proportions of protein and carbohydrate.

How well this adaptation has been made is shown in the comparative analysis below.

S-M-A and mother's milk are the same in all these important respects:

FAT—The same Reichert-Meissel, iodine, saponification and Polenske numbers; same refractive index and melting point.

CARBOHYDRATE—Lactose *only*.

PROTEIN—Low buffer action, low curd tension; same amino acids essential to growth.

VITAMINS—S-M-A contains the same *or greater* amounts of all vitamins known to be essential except C—a requirement satisfied by regular orange or tomato juice supplement.

MINERALS—S-M-A contains all minerals known to be essential to baby's needs. Calcium and phosphorus are in proper balance; iron content is ten times that of human milk.

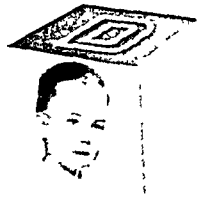
AND—The nutritional history of S-M-A-fed infants is like that of breast-fed infants when measured by development and comfort.

S-M-A is a complete infant food except for ascorbic acid—easily digested and antirachitic. S-M-A babies develop firm tissue, are free of nutritional disturbances.

Wyeth®

S-M-A®

WYETH INCORPORATED • PHILADELPHIA 3 • PA.

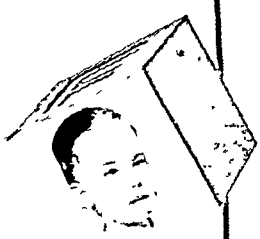


TO PLAY AGAIN



Long-term sulfonamide prophylaxis in the years after a rheumatic attack bears application in preventing recurrence of rheumatic fever and in permitting the child to pursue a near-normal life. Recent studies indicate that "whenever the rheumatic child acquires an infection it should receive vigorous antistreptococcal treatment in the form of adequate chemotheraphy."[1] As the result of a nine-year study, reviewing sulfonamide prophylaxis, "Sulfamerazine was regarded as potentially the sulfonamide of choice,"[2] although care must be exercised in the selection of cases restricting therapy to those having the highest probability of recurrence.

GLUCO-SULFAMERAZINE (Donley-Evans), with a Sodium Lactate-Glucose base, minimizes the danger of crystalluria or renal complications following sulfonamide prophylaxis. Sodium Lactate increases the pH of the urine, thus promoting solubility of the sulfonamide and its acetyl derivative. Slow excretion of GLUCO-SULFAMERAZINE makes the maintenance of an effective blood level relatively simple. Because of its liquid form, GLUCO-SULFAMERAZINE is particularly useful in pediatrics, facilitating accurate dosage and administration.



GLUCO-SULFAMERAZINE, a palatable liquid suspension, contains in each fluid ounce approximately 2 grams of Sulfamerazine (1 grain to a cc.) and 2.24 grams of Sodium Lactate (equivalent to the Sodium Lactate content of 20 cc. of molar Sodium Lactate solution). Warning: Sulfamerazine may produce toxic reactions; repeated blood counts should be made during the course of therapy.

Available in 6 ounce and pint bottles. Literature on request.

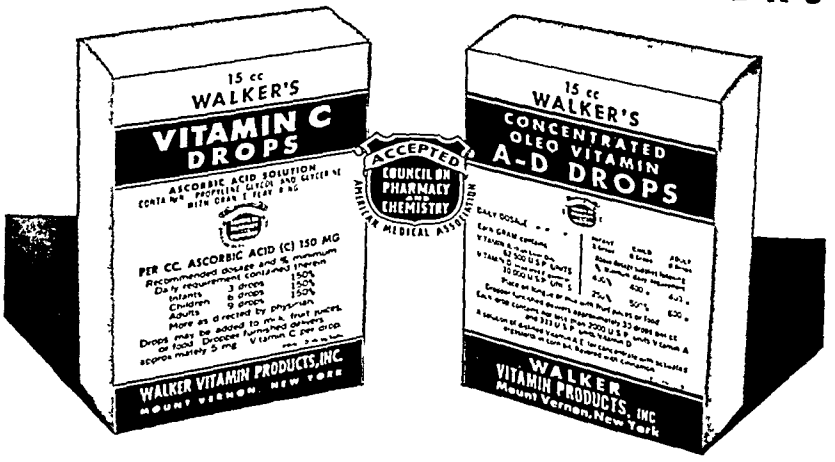
1. Elghammer, H. W.: Med. Clin. N. Am. pp. 25-34, 1946
2. Rosenberg, E. F., and Hench, P. S.: Med. Clin. N. Am. pp. 489-509, 1946

DONLEY-EVANS & COMPANY

ST. LOUIS 20 MISSOURI

WALKER

COUNCIL-ACCEPTED VITAMIN DROPS



Potent, convenient, flexible dosage form
Designated for use in pediatrics and geriatrics

VITAMIN C DROPS

Each drop supplies 5 mg. of vitamin C

Supplied in dropper bottles of 15 cc.

CONCENTRATED OLEO VITAMIN A-D DROPS

Each drop supplies 2,000 units vitamin A, 333 units vitamin D

Supplied in dropper bottles of 15 cc. and 60 cc.

Walker VITAMIN PRODUCTS, INC., MOUNT VERNON, N. Y.



ophthalmological requisite

SODIUM SULFACETIMIDE SOLUTION 30% is a new antibacterial solution for treatment and prophylaxis of all the common eye infections. Possessing a wide range of bacteriostatic activity, it inhibits numerous pathogens responsible for ocular infections. Its efficacy on local application is attributed to the facts that it is the only sulfonamide salt that can be dissolved in concentration as high as thirty per cent at physiologic pH 7.4; that it penetrates deeply into ocular tissues; that it is virtually non-irritating; and that it is not absorbed into the systemic circulation in detectable amounts.

(Sodium SULAMYD)

Treatment of eye infections: One or two drops instilled every two hours or less frequently according to the severity of the infection.

Prophylaxis following foreign body injuries and abrasion to the conjunctiva and cornea: One drop instilled three or four times daily.

SODIUM SULFACETIMIDE SOLUTION 30% is supplied in 15 cc. amber, eye-dropper bottles.

Trade-Mark SULAMYD—Reg. U.S. Pat. Off.

Schering CORPORATION · BLOOMFIELD, N. J.

IN CANADA, SCHERING CORPORATION LIMITED, MONTREAL

Ideal For The Toddlers In Your Care—

Heinz Vegetables With Lamb And Liver

A Tasty and Nutritious Blend of Lamb, Chicken and Lamb Livers, Milk and Selected Vegetables

THIS appealing combination of meat, vegetables and milk—Heinz Vegetables with Lamb and Liver—makes a well-balanced main dish for the older babies in your care! It's mildly seasoned—and chopped to a particle size that promotes baby's easy chewing! You can recommend all Heinz Junior Foods with confidence — for they're backed by a 78-year quality reputation!



TODDLERS also enjoy the other Heinz Junior Foods — such as Chopped Spinach, Pineapple Rice Pudding and Creamed Diced Vegetables!

HEINZ
VEGETABLES
WITH
LAMB & LIVER
57 VARIETIES
MADE BY
H.J. HEINZ COMPANY
57

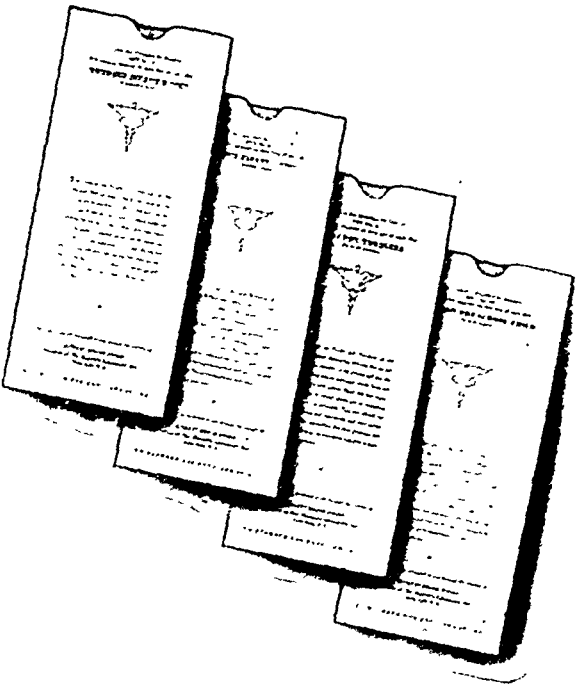
A 78-Year Reputation Backs the Complete Line of

Heinz Baby Foods

CEREALS • FRUITS • VEGETABLES
MEAT FOOD PRODUCTS • DESSERTS



Yours For The Asking, Doctor!

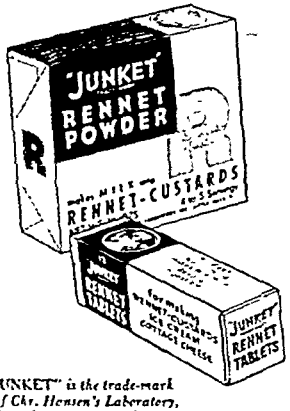


stablished Pediatric Diet Lists Bearing Your Own Name!

"Exceedingly helpful and useful". . ."time-saving". . . "efficient, self-explanatory and well-balanced". . . these, and many others, are the comments of physicians everywhere who have requested these Infants' and Children's Diet Lists during the last few years.

The lists are authoritative, flexible and comprehensive—real time-savers for the busy practitioner!

Imprinted with your name, address and telephone number, they are offered as a complimentary service by "Junket" Brand Foods. Won't you fill out the coupon below so that we may send you samples of personally imprinted lists together with full-size packages of "Junket" Brand Rennet Powder and "Junket" Rennet Tablets for your trial and appraisal?



"JUNKET" is the trade-mark of Chr. Hansen's Laboratory, Inc., for its rennet and other food products, and is registered in the United States and Canada.

"JUNKET" BRAND FOODS
Division of Chr. Hansen's Laboratory, Inc.
LITTLE FALLS, N.Y.

Milk may be made into easily digested desserts with either rennet powder or rennet tablets.

MAIL THIS COUPON TODAY!

"JUNKET" BRAND FOODS
Division of Chr. Hansen's Laboratory, Inc.
Little Falls, N. Y. B-107

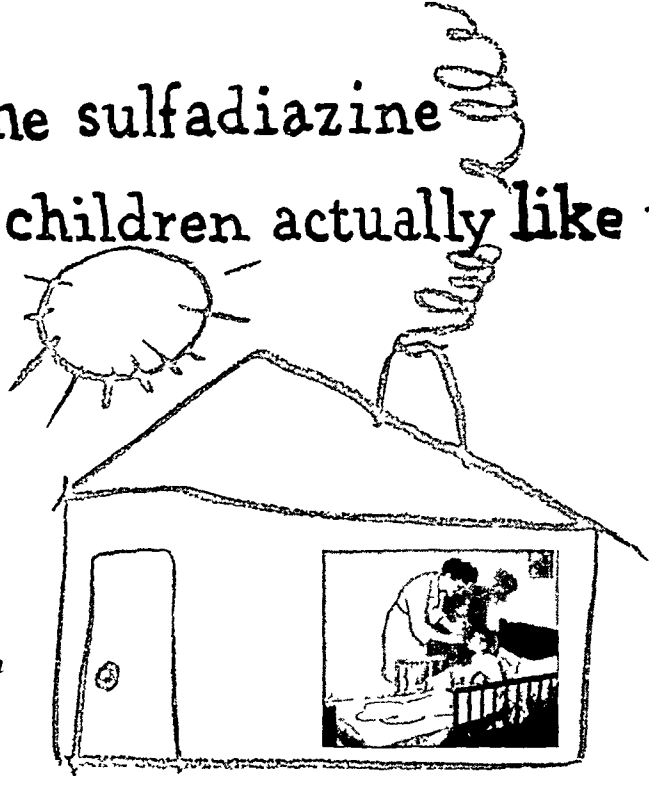
Please send me samples of your infants' and children's diet lists. Also Trial packages of "Junket" Rennet Powder and Tablets.

Name _____ (Please Print)

Address _____

City _____ *State* _____

Here's the sulfadiazine that children actually like to take



Children have no reluctance in taking ***Eskadiazine***



Exceptionally flavorful, this fluid sulfadiazine is the ideal dosage form for your young patients. They take it willingly because it tastes good. And it relieves tired parents and busy nurses of the chore of crushing tablets and coaxing a sick child to swallow an unappealing mixture.

Important, too, is the more rapid absorption of Eskadiazine. Flippin and associates* have established that desired serum levels are attained in two hours, rather than the six hours required for sulfadiazine in tablet form.

Eskadiazine

*Am J M Sc 210 111, 1945

Smith, Kline & French Laboratories, Philadelphia

the outstandingly palatable fluid sulfadiazine for oral use

from the third week of life to adolescence...



The simplicity and convenience of using milk diffusible Drisdol in Propylene Glycol facilitate patient cooperation from early infancy to adolescence.

An average daily dose of 2 drops in milk for infants and from 4 to 6 drops for children provides effective low-cost vitamin D protection throughout the critical years of growth and development.

Available in bottles of 5, 10 and 50 cc. with special dropper delivering 250 U.S.P. units per drop.

DRISDOL *IN PROPYLENE GLYCOL*

MILK DIFFUSIBLE VITAMIN D PREPARATION

ODORLESS · *TASTELESS* · ECONOMICAL

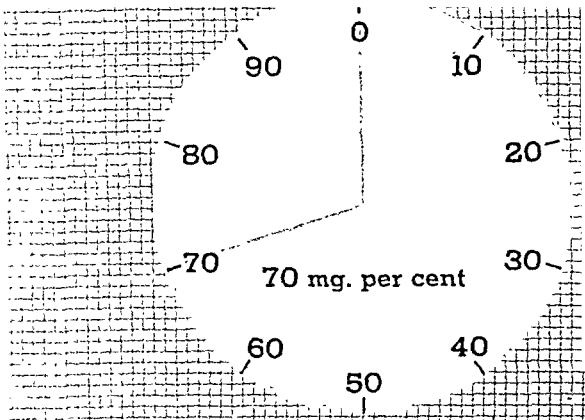
DRISDOL, trademark reg. U. S. Pat. Off. & Canada, brand of crystalline vitamin D_2 (calciferol) from ergosterol

WINTHROP

Winthrop

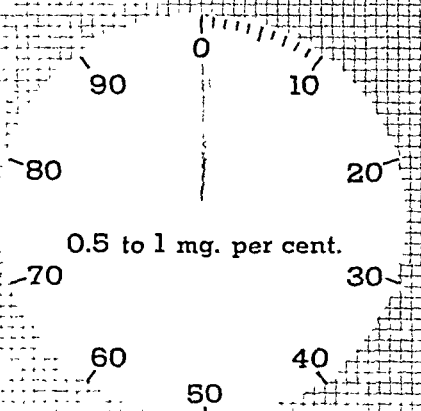
CHEMICAL COMPANY, INC.

New York 13, N. Y. · *Windsor, Ont.*



HIGH Local Sulfonamide Concentration

A single tablet of White's Sulfathiazole Gum chewed for one hour, *maintains* a high, effective *salivary* concentration of *locally* active sulfathiazole averaging 70 mg. per cent.



Negligible Systemic Absorption

With maximal dosage of Sulfathiazole Gum, even in children, blood levels of sulfonamide are usually too low to be quantitatively measurable, rarely approaching 0.5 to 1 mg. per cent. The gum vehicle serves as a "reservoir" for the drug which is released slowly at a rate roughly paralleling the drug's solubility in saliva. Systemic absorption is so limited that toxic



For this new G-E Prescription Ultraviolet Lamp makes possible an ample supply of easily controlled, regularly administered therapeutic ultraviolet with all its characteristic benefits in any season or weather.

Designed for use in the home through your prescription—or in your office under your direct supervision—this new, low cost portable lamp provides an economical, dependable source of therapeutic ultraviolet with emission characteristics throughout the spectral bands of proven clinical value.

For complete information about how this versatile new ultraviolet lamp will help you in your practice, clip and mail this valuable coupon today. Address Dept 2684, General Electric X-Ray Corporation, 175 W Jackson Blvd, Chicago 4, Illinois

Copy No 2684–5 x7½"—Jrnl of Pediatrics, Oct 1947

GENERAL ELECTRIC X-RAY CORPORATION

General Electric X-Ray Corporation
175 W. Jackson Blvd., Chicago 4, Ill.

I would like to know more about the new R Lamp.

Name_____

Address_____

City_____

State_____

2684



First breath, first bath, first bottle

In a life filled with "firsts", baby has no time to cope with such gastro-intestinal problems as carbohydrate fermentation and attendant distention and diarrhea—particularly during his first few weeks.

'Dexin' has proven an excellent "first carbohydrate" because 1) its high dextrin content is not fermentable by the organisms usually present in the intestinal tract, and 2) because it promotes the formation of soft, flocculent, easily digested curds.

Simply prepared in hot or cold milk, 'Dexin' brand High Dextrin Carbohydrate is easily adapted to increasing formula needs from month to month, and later, being palatable but not too sweet, is a welcome supplement to other bland foods. 'Dexin' *does* make a difference.

'Dexin' BRAND HIGH DEXTRIN CARBOHYDRATE

Composition—Dextrins 75% • Maltose 24% • Mineral Ash 0.25% • Moisture 0.75% • Available carbohydrate 99% • 115 calories per ounce • 6 level packed tablespoonfuls equal 1 ounce • Containers of twelve ounces and three pounds • Accepted by the Council on Foods and Nutrition, American Medical Association.

Literature on request

'Dexin' Reg. Trademark

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 East 41st St., New York 17, N. Y.

NEW!

- FOR STUDENTS
- FOR SPECIALISTS
- FOR GENERAL PRACTITIONERS



QUICK REFERENCE BOOKLET

"Oatmeal's Advantages as a Food for Children"

BY

FREDUS N. PETERS, JR., Ph.D.
Director of Research
THE QUAKER OATS COMPANY

Brief and convenient in format this booklet is a practical digest of the nutritional advantages of whole-grain oatmeal in the dietary of infants and children. It not only discusses the function of this natural cereal in the child's diet and contains much helpful cereal information for every day use, but in handy reference tables, presents scientific evidence of these important facts about oatmeal:

Oatmeal not only furnishes more protein than any other natural cereal but the biological value of its protein is higher.

Oatmeal leads all other natural cereals in iron, thus helps to replenish the supply of iron often deficient in infants soon after birth.

Oatmeal contains ounce for ounce, at least twice as much of any amino acid as is contained in milk.

Oatmeal has the highest Vitamin B_1 content of any natural cereal.

Economy also important in recommending oatmeal as the cereal supplement in the infant's diet: It is a fact that few, if any, foods provide as much Protein, Vitamin B_1 and Iron per penny as oatmeal In addition, national distribution makes it easily available to any family. And when this food is recommended for the infant, all members of the family can use the same product as a breakfast cereal.

A copy of this handy reference booklet will be sent you upon request.

Quaker Oats

The World's Best-Tasting Breakfast Food

Quaker and Mother's Oats Are the Same



MAIL TODAY !

THE QUAKER OATS COMPANY
Box 712, Chicago 90, Illinois

Please send me a free copy of this new booklet, "Oatmeal's Advantages as a Food for Children."

Dr. ....

Address.. .....

City..... Zone....State.....



Reduces **the hazards of**

intensive sulfonamide therapy

50th ANNIVERSARY

By combining sulfadiazine and sulfathiazole in a single preparation, the dangers of crystalluria and its troublesome complications are greatly reduced. Recent studies* have shown that the total urine solubility of two sulfonamides is greater than that of a single sulfonamide, since the presence of one exerts little influence upon the solubility of the other. Consequently, a greater total quantity of concurrently administered sulfadiazine and sulfathiazole can be dissolved in the urine than of either drug alone.

Added renal protection is provided in Aldiazol by the presence of sodium citrate and sodium lactate which alkalinize the urine and further increase sulfonamide solubility.

Rapid absorption of Aldiazol is promoted, since the contained sulfadiazine and sulfathiazole are in microcrystalline form. In consequence, higher blood levels are attained in shorter time than with ordinary sulfonamides.

Aldiazol is indicated whenever sulfonamide therapy is called for. Because of its liquid form, it is especially useful in children, facilitating accurate dosage as well as administration.

Each teaspoonful of Aldiazol contains:

Sulfadiazine (microcrystalline)	0.25 Gm.	Sodium Citrate	0.46 Gm.
Sulfathiazole (microcrystalline)	0.25 Gm.	Sodium Lactate	0.55 Gm.

*Lehr, D.: Proc.Soc.Exper.Biol.& Med. *58*:11 (Jan.) 1945

ALDIAZOL

Microcrystalline Sulfadiazine and Sulfathiazole in an alkalizing vehicle containing Sodium Citrate and Sodium Lactate

The S. E. MASSENGILL COMPANY
Bristol, Tenn.-Va.
NEW YORK • SAN FRANCISCO • KANSAS CITY

SEMCO



Are babies too much like people?

Babies would be a lot less trouble if they'd automatically like all the things that are good for them. But they won't.

So Gerber's can't stop at making baby foods that are merely "good for" babies. It isn't nearly enough that the high nutritional values of Gerber's Baby Foods please doctors.

We have to be specialists in making foods that babies like better, too. In fact, one of the reasons Gerber's please so many mothers is that babies like them so well.



Take Gerber's 3 Cereals. All 3 have the "just right" taste and texture that babies go for. And all three are enriched with *added iron, calcium,* and *vitamin B-complex.*

From Cereals through Strained and Junior Foods . . . *there isn't a single one of all Gerber's 34 baby foods that isn't specially prepared to suit baby tastes.*

A card to Gerber's, Dept. 2710-7 Fremont, Mich., will bring you samples of the cereals, together with professional reference cards.

Gerber's

FREMONT MICH. OAKLAND, CAL.

Baby Foods

3 CEREALS • 18 STRAINED FOODS • 13 JUNIOR FOODS



AN EXCELLENT FIRST CEREAL

and well liked at any age

Malt-o-Meal meets every requirement for a first infant cereal food—a well rounded nutritional composition, blandness, easy digestibility, creamy smooth consistency, and absence of residue. It provides not only the nutrients ordinarily found in a wheat cereal, but also notable amounts of added thiamine, riboflavin, niacin and iron. Its freedom from grittiness and large particles makes Malt-o-Meal readily accepted by infants whose well developed lingual tactile sense promptly detects objectionably large particles. Older children and adults especially enjoy the delightful taste of this wheat cereal flavored with toasted malt. Malt-o-Meal is eaten with gusto by children, and merits inclusion in any well rounded breakfast.

CAMPBELL CEREAL COMPANY, Minneapolis, Minn.

Malt-o-Meal



Malt-o-Meal, an enriched wheat cereal flavored with toasted malt, provides per

Meal provides appreciably



BABY'S FIRST SMILE

Such a twinkly, crinkly little grin! What mother wouldn't be thrilled? And when that first smile reflects steady, healthful growth, it's truly a cause for celebration

Yes, every mother wants to keep her baby healthy, sunny and smiling. That's why White House is so popular for infant feeding It supplies each essential nutrient of fresh milk, as well as precious vitamin D_3. It's wholesome and easy to digest. Truly, there's none better!

WHITE HOUSE MILK

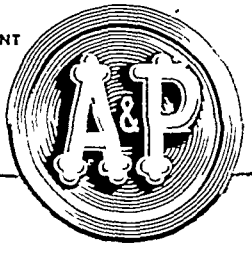
There's None Better

400 U S P. UNITS OF PURE VITAMIN D_3 PER PINT

SOLD AND GUARANTEED* BY A&P

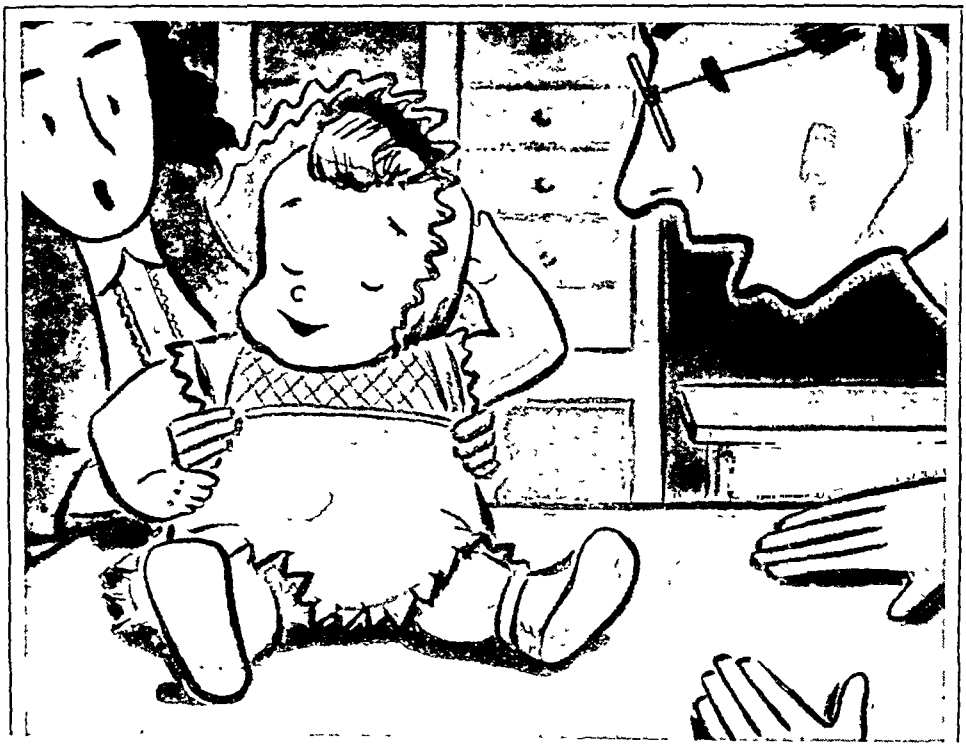
Mother's first thought for infant feeding!





*Satisfaction Guaranteed or money back

Not Connected With Any Company Using A Similar Name Or Brand



"If you come up to see me sometime, doctor—be sure to bring D-P-T*!"

Where else *but* in D-P-T—Cutter's combined vaccine—will you find all these distinct advantages:

Phase I pertussis organisms grown on human blood—to avoid the danger of sensitization to animal protein. It also assures high antigenicity of pertussis organisms.

Diphtheria and tetanus toxoids highly purified—so that each cc. contains well over one human dose.

A formula which supplies in each cc. *40 billion Phase I pertussis organisms—plus the purified toxoids*—permitting a dosage schedule of only 0.5 cc., 1 cc., 1 cc.

You'll find more advantages in another Cutter product—D-P-T (*Alhydrox*). Not only does it provide higher immunity levels than alum precipitated vaccines—it reduces to a minimum such side reactions as persistent nodules and sterile abscesses. Presents less pain on injection, too, because of a more normal pH.

Try Cutter D-P-T—Plain or Alhydrox—you'll be pleased with the results.

★*Cutter's brand of combined diphtheria, pertussis and tetanus antigens.*

Cutter Laboratories, Berkeley, California
Chicago • New York



For your "anxious-to-do-right" parents, Cutter offers an informative new booklet—"How to Prevent Diseases of Children." Write us for the gift copies you'll need.

CUTTER
Fine Biologicals and
Pharmaceutical Specialties



Ayerst "Beminal" preparations are specifically designed to replace "square-peg-round-hole" vitamin therapy. Kept constantly in line with latest therapeutic developments, they provide a range of five distinctive combinations for selective treatment.

"BEMINAL" Forte with VITAMIN C (Capsules) No. 817. Highly potent preparation of B factors with vitamin C.

"BEMINAL" Forte INJECTABLE Dried No. 495. High concentration of important B factors for intensive therapy.

"BEMINAL" GRANULES No. 925. Vitamin B complex in a dry, palatable and readily soluble form.

"BEMINAL" with IRON and LIVER (Capsules) No. 816. Ferrous carbonate, liver and B complex for the treatment of iron deficiency anemias.

"BEMINAL" TABLETS No. 815. For the prophylaxis and treatment of mild or subclinical vitamin B complex deficiencies.

"BEMINAL"®

FOR "B" THERAPY

AYERST, McKENNA & HARRISON Limited

22 EAST 40TH STREET, NEW YORK 16, N. Y.

"Food allergies are more common in infants and young children than in later life" *

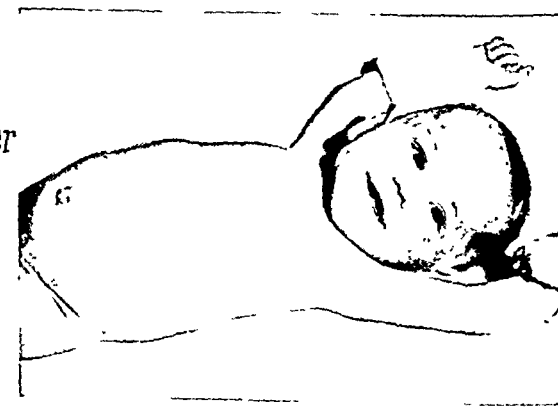


before Mull-Soy

And first in the list of offending foods is *milk*... milk, that most vital constituent in all infants' and children's diets!

• Fortunately, milk can be replaced with MULL-SOY, a hypoallergenic soy food possessing the essential nutritional values of cow's milk, but free from offending animal proteins.

• MULL-SOY is a biologically complete vegetable source of all essential amino acids, and approximates cow's milk in its percentages of protein, carbohydrate, fat and mineral content when mixed with water in standard dilution (1:1). Infants (as well as children and adults) find MULL-SOY palatable, easy to digest, and well tolerated. It is simple to prepare.



after Mull-Soy

*Levine, S. Z. · J A M A 128 283, May 26, 1945

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N. Y.
In Canada write The Borden Company, Limited
Spadina Crescent, Toronto



MULL-SOY

WHEN MILK BECOMES "FORBIDDEN FOOD"

MULL-SOY is a liquid emulsified food prepared from water, soy flour, soy oil, dextrose, sucrose, calcium phosphate, calcium carbonate, salt, and soy lecithin; homogenized and sterilized. Available in 15½ fl. oz. cans at all drug stores.

PRECISION CHEMOTHERAPY–TOPICALLY–
IN OROPHARYNGEAL INFECTIONS

The clinical value and safety of White's Sulfathiazole Gum in the topical treatment of oropharyngeal infections has been established by longer professional use than any other local chemotherapeutic or antibiotic agent. Full stability and, therefore, potency is retained under all ordinary conditions.

Supplied in packages of 24 tablets—3¾ grs. (0.25 Gm.) per tablet—sanitaped, in slip-sleeve prescription boxes.

LABORATORIES, INC., Pharmaceutical Manufacturers, Newark 7, N. J.

ulfathiazole gum

SAFE, TOPICAL CHEMOTHERAPY

Candy and the Cephalic Phase of Digestion



That the pleasant sense of satiety and satisfaction which follows a good meal is conducive to trouble-free digestion has been repeatedly experienced by everyone. The psychic influence of the sight and taste of attractive food upon the secretion of the digestive juices and upon gastrointestinal motility is probably the basis for this observation. A meal which ends with a piece or two of candy is usually regarded as a satisfying meal. In this manner candy can rob even an ordinary meal of its drabness. Children look forward to this treat at the end of their meals; this very anticipation encourages them to eat their other foods more eagerly. And few indeed are the adults who do not enjoy a sweet after lunch or dinner.

Candies are made with many wholesome and nutritionally valuable foods—milk, butter, eggs, fruits, and nuts. To the extent these foods are present, candies provide valuable protein, minerals, and B complex vitamins. Readily utilized caloric food energy is also supplied by candies.

COUNCIL ON CANDY OF THE NATIONAL CONFECTIONERS' ASSOCIATION

1 NORTH LA SALLE STREET • CHICAGO 2, ILLINOIS

PIONEERS in Research . . . and Leadership thru the years in combating



DOHO in realizing the need for a potent, topical, well tolerated ear medication, yet mindful that no one formula could be suitable for all conditions . . . devoted every facility and scientific resource to the development and perfection of AURALGAN and OTOSMO-SAN. Each has its sphere of usefulness . . . each has been tested and clinically proven in many thousands of cases. *Reprints and substantiating data sent on request.*

EACH A SPECIFIC . . . both effective!

Auralgan
IN ACUTE OTITIS MEDIA

is a scientifically prepared, completely water-free Glycerol (DOHO) having the highest specific gravity obtainable, containing antipyrine and benzocaine . . . which by its potent decongestant, dehydrating and analgesic action provides effective relief of pain and inflammation.

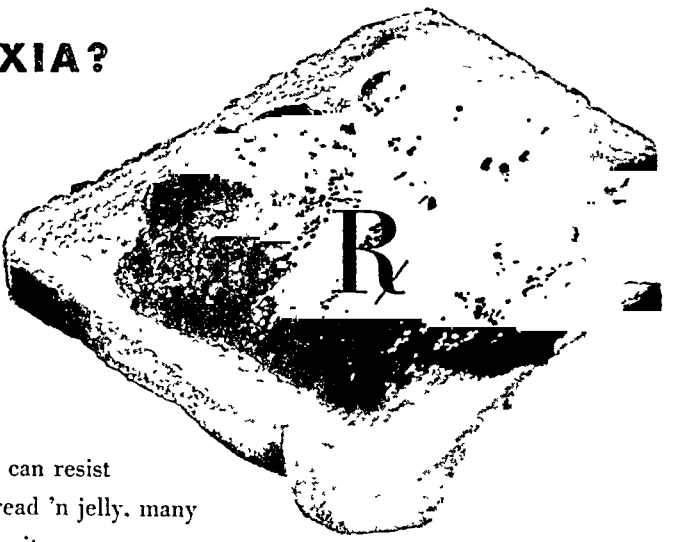
O-TOS-MO-SAN
IN CHRONIC SUPPURATIVE OTITIS MEDIA, FURUNCULOSIS AND AURAL DERMATITIS

is not just a mere mixture, but a scientifically potent chemical combination of Sulfathiazole and Urea in AURALGAN Glycerol (DOHO) base . . . which exerts a powerful solvent action on protein matter, liquefies and dissolves exuberant granulation tissue, cleanses and deodorizes, and tends to exhilarate normal tissue healing in the effective control of chronic suppurative otitis media.

Literature and samples on request

THE DOHO CHEMICAL CORPORATION
New York 13, N. Y. • Montreal • London

EVER TRY BREAD 'N JELLY THERAPY IN ANOREXIA?



Because few children can resist a luscious piece of bread 'n jelly, many pediatricians are using it as a weapon to combat anorexia—the commonest complaint in pediatrics. With a spoonful of 'Ryzamin-B' No. 2 added to the spread, this universal favorite becomes a potent source of B complex vitamins to provide the needed stimulus to lagging appetites. So pleasant is its rich, honey-like flavor that children seldom are aware that they are taking medicine. Most children take 'Ryzamin-B' No. 2 right off the spoon; all children enjoy it when given as a delicious spread mixed with jam or peanut butter or dissolved in milk, fruit juice or their favorite beverage.

Containing the *natural* B complex as a concentrate of Oryza sativa (American rice) polishings, 'Ryzamin-B' No. 2 also supplies potent synthetic B factors.



'RYZAMIN-B' BRAND RICE POLISHINGS CONCENTRATE **NO. 2**

WITH ADDED THIAMINE HYDROCHLORIDE, RIBOFLAVIN AND NICOTINAMIDE

TUBES OF 2 OZ. AND BOTTLES OF 8 OZ

'Ryzamin B' registered trademark

BURROUGHS WELLCOME & CO (U.S.A.) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

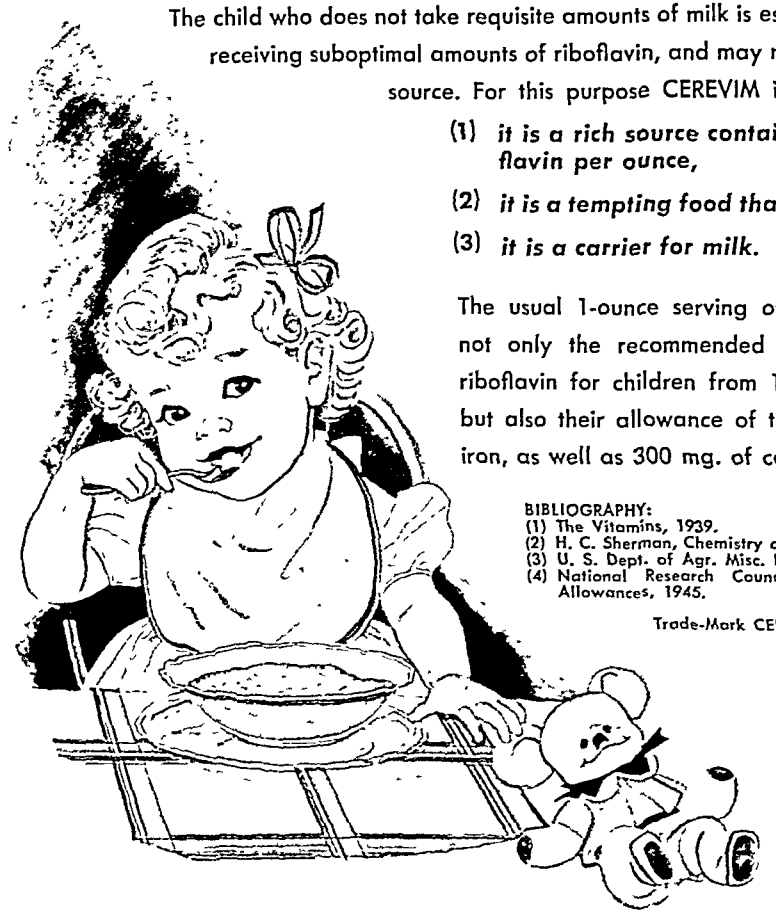
CEREVIM *a first among first foods*

remarkably high in RIBOFLAVIN

"essential to the defense powers of the organism"

—J.A.M.A.[1]

Riboflavin is directly related to growth as well, and the "slowing of growth which results from suboptimal intake of riboflavin is accompanied by a corresponding retardation of development."[2] How vital then is ample intake of riboflavin during childhood! And yet this vitamin is the least adequately supplied nutrient in the ordinary diet.[3]



The child who does not take requisite amounts of milk is especially likely to be receiving suboptimal amounts of riboflavin, and may need a supplemental source. For this purpose CEREVIM is excellent because

(1) ***it is a rich source containing 0.9 mg. riboflavin per ounce,***

(2) ***it is a tempting food that children like, and***

(3) ***it is a carrier for milk.***

The usual 1-ounce serving of CEREVIM provides not only the recommended daily allowance of riboflavin for children from 1 to 3 years of age but also their allowance of thiamine, niacin, and iron, as well as 300 mg. of calcium.[4]

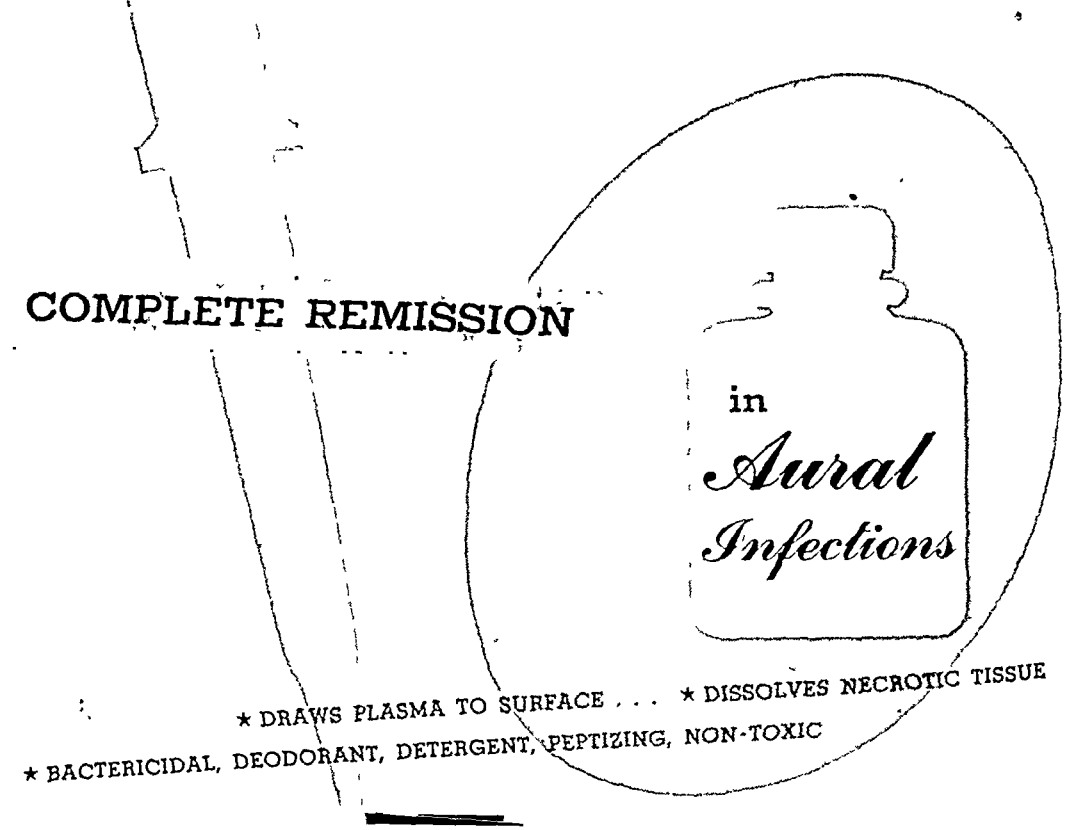
BIBLIOGRAPHY:
(1) The Vitamins, 1939.
(2) H. C. Sherman, Chemistry of Food and Nutrition, 1946.
(3) U. S. Dept. of Agr. Misc. Pub. No. 546, 1945.
(4) National Research Council, Recommended Dietary Allowances, 1945.

Trade-Mark CEREVIM — Reg. U.S. Pat. Off.

LEDERLE LABORATORIES DIVISION

AMERICAN CYANAMID COMPANY · NEW YORK 20, NEW YORK

Lederle



Glycerite of Hydrogen Peroxide *ipc*
With Carbamide

Clinical studies concerned with the use of Glycerite of Hydrogen Peroxide in the treatment of chronic purulent otitis media demonstrated seventeen of twenty-nine patients in complete remission in 14 days and the remainder by the 38th day. The patients studied presented conditions existent for periods of 2 weeks to over 40 years. Previous treatment by the usual therapeutic means, including tyrothricin or penicillin, was ineffective in all cases.

★ BIBLIOGRAPHY
Arch. Otolaryngol., 43 605, 1946.
E., E., N., & T. Mo., 26 27, 1947.
Laryngoscope, 56 556, 1946.
New Eng. J. Med., 234·468, 1946.
Annals of Allergy, 4 33, 1946.
J. A. Ph., A., (Sc. Ed.) 35:304, 1946.
Literature on request.

Constituents:
Hydrogen Peroxide 1.446%, Urea (Carbamide) 2.554%, 8 Hydroxyquinoline 0.1%. Dissolved and stabilized in substantially anhydrous glycerol . . . q.s. ad. 30cc.

Available on prescription in one-ounce bottle with dropper.
Administration One-half dropperful two to four times daily.

International **PHARMACEUTICAL CORPORATION**
132 NEWBURY STREET, BOSTON 16, MASSACHUSETT

Q: Is chewing a lost art?

A: *It needn't be . . . with Ry-Krisp.*

Ry-Krisp Stimulates Teeth and Gums.

Children need the crisp crunchiness of Ry-Krisp. So do youngsters in the "teething age."

Ry-Krisp Satisfies Between-meal Hunger.

But does not spoil youngsters' regular mealtime appetites. Made of whole grain rye with only salt and water added, it is low in carbohydrates.

Ry-Krisp Is Good for Mealtime Nourishment.

Has the protein, minerals and B complex vitamins of whole rye. Delicious, tempting flavor, too.

Keep Ry-Krisp in Mind for Your Young Patients.

A SERVICE FOR YOU.

Allergy Diets — Wheat-free, Egg-free, Milk-free, Wheat-Egg-Milk-free and Restricted Diagnostic. Send for booklet containing single copies so you may order free diet pads as needed. Use coupon below.



RALSTON PURINA COMPANY, Nutrition Service
JP-A Checkerboard Square, St. Louis 2, Missouri

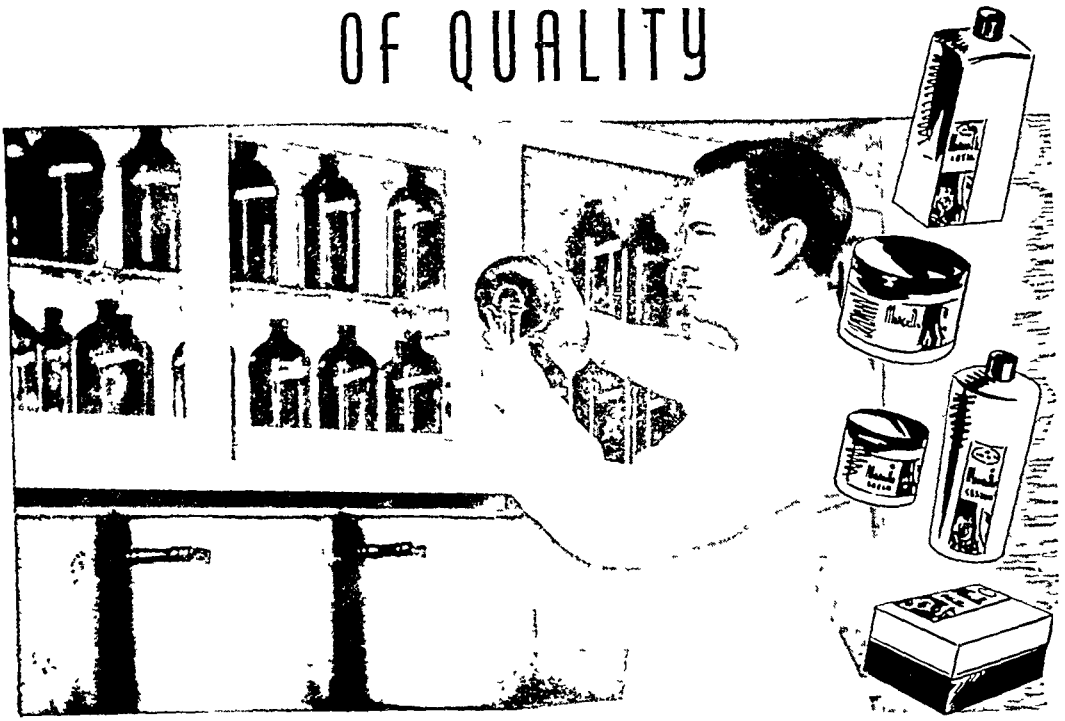
Please send, no cost or obligation: C2143 Allergy Diets Booklet.

Name.....

Street.....

City.....*Zone*.....*State*.....

LABORATORY CONTROL
is convincing evidence
OF QUALITY



Actual Photograph of Marcelle Laboratory

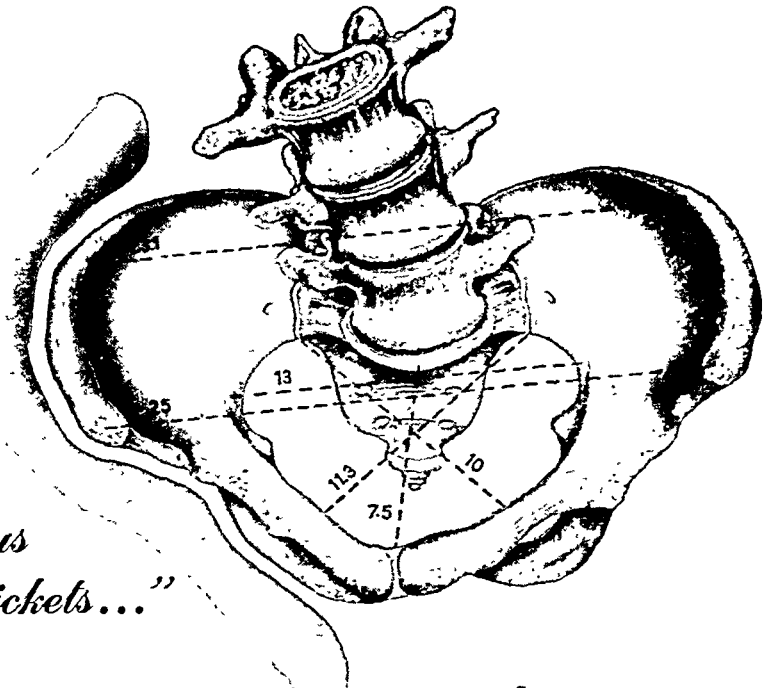
LABORATORY CONTROL insures constant, uniform quality of product. Continuous tests in the immaculate Marcelle laboratory safeguard the quality of Marcelle hypo-allergenic Cosmetics. Built on research and carefully processed. Skilled chemists check each ingredient used in making these fine cosmetics. Known allergens have been eliminated or reduced to tenable minimums.

You are cordially invited to inspect our laboratory . . . see our methods from start to finish in the testing and blending of these quality cosmetics.

Acceptable for advertising in publications of the American Medical Association for 15 years.

Marcelle HYPO-ALLERGENIC COSMETICS

MARCELLE COSMETICS, INC.
1741 N. WESTERN AVE., CHICAGO 47, ILL.



"The most serious result of rickets..."

In the opinion of many clinicians, "pelvic distortion ... is the most serious result of rickets."[1] Severe deformities which "obstruct childbirth and may cause death of both mother and infant"[2] as well as "the so-called 'simple flat' pelvis"[3] are often "rachitic in origin."[3] In the prevention of rickets and other vitamin deficiency syndromes, the use of Vi-Penta Drops 'Roche' offers clinically important advantages. The drops are willingly taken even by "difficult" patients since they are miscible and may be added to milk, fruit juice or other foods without significantly affecting the flavor. The comprehensive formula of Vi-Penta Drops supplies in each 10-minim dose no less than 1000 U.S.P. units of vitamin D *plus* ample amounts of vitamins A, B_1, B_2, C and niacinamide. Vi-Penta Drops are available in 15-cc and 30-cc vials. For a free trial supply, write to department V-3, Hoffmann-La Roche Inc., Roche Park, Nutley 10, New Jersey.

1. F. Bicknell and F. Prescott, The Vitamins in Medicine, Grune & Stratton, 1946.
2. M. M. Eliot and E. A. Park, Brennemann's Practice of Pediatrics, W. F. Prior Co., Inc., 36:66, 1946.
3. J. B. De Lee and J. P. Greenhill, Obstetrics, W. B. Sanders, 1943.

VI-PENTA DROPS 'ROCHE'

T.M.—Vi-Penta—Reg U S. Pat. Off.

HOFFMANN-LA ROCHE INC • NUTLEY 10 • NEW JERSEY

Q: Is any germ a "good" germ?

A: *Yes—wheat germ is a "good" germ—it's the richest cereal source of thiamine (vitamin B_1) and provides protein of high biological value.*

Hot Ralston has EXTRA Wheat Germ
Yes; *extra* wheat germ is added to this whole wheat cereal—makes it 2½ times as rich in wheat germ as whole wheat. That's why . . .

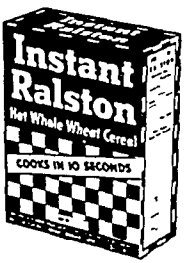
Hot Ralston has EXTRA Thiamine and Protein—A good reason why you should recommend Hot Ralston as an extra-nourishing food for children and adults.

TWO KINDS OF HOT RALSTON

COOKS IN 5 MINUTES



COOKS IN 10 SECONDS



Both natural whole wheat—both with extra wheat germ—both delicious.

RALSTON PURINA COMPANY
Checkerboard Square St. Louis 2, Missouri



A fine introduction to chicken

. . . *Beech-Nut Chicken Soup*

Good midday meal

The older infant will enjoy Chicken Soup at noontime. With a vegetable and a dessert it makes a satisfying, nutritious lunch. Lower calorically than cereal, it might replace cereal at supper for the overweight child.

INGREDIENTS

Chicken broth, enriched farina, carrots, celery, chicken, salt, onions and yeast.

Beech-Nut Foods for Babies meet the high standards of the Council on Foods and Nutrition of the American Medical Association. All nutritional statements in Beech-Nut advertising also have been accepted.

Fine, full flavor

Cooked in closed cookers to extract and retain natural flavor, Beech-Nut Chicken Soup has a home-cooked taste. Small pieces of chicken meat add to the richness of the yellow broth.



Beech-Nut

STRAINED & JUNIOR

Foods *for* Babies

PACKED IN GLASS

A most important fact to remember when you recommend baby foods to mothers



COMBINED FOR DEFENSE

The satisfactory results achieved, the element of time saved, and the convenience for the patient have assured the wide acceptance of alum precipitated ***Diphtheria-Tetanus-Pertussis Combined.*** *The triple defense action of these* "Council-Accepted" multiple antigens has shown evidence of dependable immunizing ability and enhanced activity.

Recommended for infants and pre-school children, immunization consists of three 0.5 cc. subcutaneous injections at intervals of from four to six weeks.

The antigenic content of *H. pertussis in* **Diphtheria-Tetanus-Pertussis Combined** has been increased to 45,000 million organisms per immunizing treatment.

SUPPLIED:
DTP 3—One Immunization, 3—½ cc. Vials
DTP 15—Five Immunizations, 3—2½ cc. Vials

DIPHTHERIA - TETANUS - PERTUSSIS COMBINED
ALUM PRECIPITATED

DIPHTHERIA
TETANUS
PERTUSSIS COMBINED

THE NATIONAL DRUG COMPANY
PHILADELPHIA 44, PA.

PHARMACEUTICALS, BIOLOGICALS, BIOCHEMICALS FOR THE MEDICAL PROFESSION

INFANTS NEED THREE TO FOUR TIMES MORE PROTEIN PROPORTIONATELY THAN ADULTS*

MEAT APPROPRIATELY PREPARED MAY BE FED AT ANY AGE*

MEAT... strained fine enough for baby's bottle!





Swift's Strained Meats and Swift's Diced Meats...

meet the exacting requirements of a highly desirable infant food

1. *Nutrition for growth*—Swift's Meats for Babies furnish complete, high-quality proteins, B vitamins and iron.

2. *Compact form*—for infants' limited capacity—*all meat*, not mixtures, they provide a concentrated source of vital nutrients.

3. *Control—for individual needs.* Ready-made mixtures may fail to meet individual needs. Mothers can control and balance amounts of meat *exactly* with Swift's Strained and Swift's Diced Meats.

4. *Variety for nutritionally sound eating habits*—six different all-meat products to help infants acquire the taste for variety, the foundation of good nutrition.

For complete information and samples of Swift's Strained and Swift's Diced Meats, write Swift & Company, Dept. BF, Chicago 9, Illinois.

Swift's Strained Meats make earlier meat-feeding easy

The individual particles of meat in Swift's Strained Meats are actually fine enough to pass through the nipple of a nursing bottle . . . may be mixed with formula as a protein supplement, where desired. Ordinarily, however, Swift's Strained Meats are intended to be fed as soon as infants begin taking solid foods. In clinical feedings** these strained meats were fed to babies six weeks old with no instances of gastro-intestinal upsets. What a far cry—these specially prepared strained meats, from the old hand-scraped meats, which, until now, baby was lucky to get. Today when you recommend meats for infants' diets, mothers can follow your instructions *exactly*, *easily* and *economically* . . . Swift's Strained Meats are ready to heat and serve! There's no waste, no fuss or bother.

Swift's Strained Meats provide infants with the complete, high-quality proteins their fast-growing bodies require. (This amount is actually 3 to 4 times more, proportionately, than an adult requires.) Meat also furnishes substantial amounts of thiamine, niacin and riboflavin, plus iron. Six tempting kinds: beef, lamb, pork, veal, liver and heart provide a variety that helps baby acquire new tastes, develop nutritionally sound eating habits.

ACCEPTED Council on Foods and Nutrition

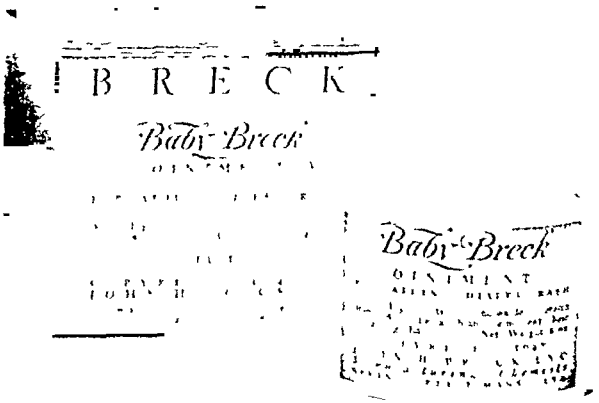
All nutritional statements made in this advertisement are accepted by the Council on Foods and Nutrition of the American Medical Association.

SWIFT QUALITY FOODS

*Names of authorities on request

**Details on request

SWIFT & COMPANY • CHICAGO 9, ILL.



Baby Breck

OINTMENT

For Aiding Diaper Rash

Sometimes keeping an infant dry is not enough to prevent a diaper rash. Baby Breck Ointment helps to protect the exposed skin through the long night period. There is a minimum allergic reaction to Baby Breck Ointment due to the neutral qualities of its ingredients. One or two applications are sufficient during the day to help the milder cases of diaper rash.

JOHN H BRECK INC · MANUFACTURING CHEMISTS · SPRINGFIELD 3 · MASSACHUSETTS
CANADIAN ADDRESS · 310 SLATER STREET · OTTAWA



"No . . . he doesn't spit them out!"

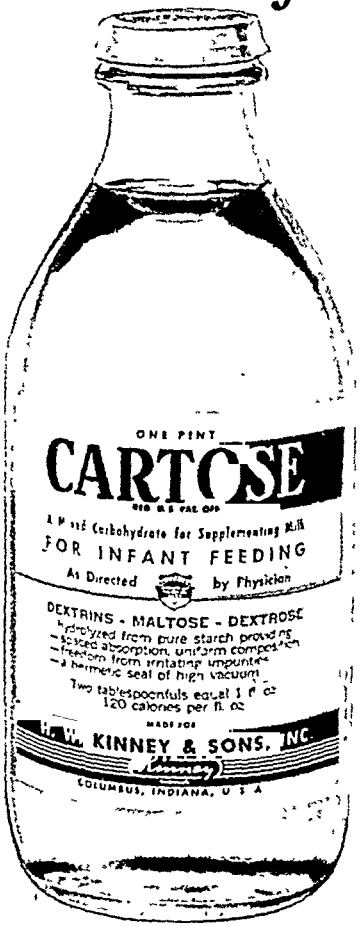
The well developed tactile sense of the infant's tongue readily recognizes large or coarse food particles. and quickly leads to their rejection. Through an exclusive process of homogenization, the largest particle left in Libby's Baby Foods is of microscopic size. Cell capsules are ruptured. making for absolute smoothness of texture and complete absence of grittiness. Nutrients are homogeneously dispersed. enhancing availability. In Libby's Baby Foods fluid separation is never observed, further evidence of the advantages of homogenization.

Beets • Carrots • Green Beans • Peas • Spinach • Squash • Vegetable Soup • Mixed Vegetables • Garden Vegetables • Liver Soup • Vegetables with Bacon • Vegetables with Beef and Barley • Vegetables with Lamb • Apples and Apricots • Apples and Prunes • Apple Sauce • Peaches • Peaches-Pears-Apricots • Pears and Pineapple • Prunes (with Pineapple Juice and Lemon Juice) • Custard Pudding

Libby, McNeill & Libby • Chicago 9, Illinois

Libby's STRAINED AND HOMOGENIZED BABY FOODS

Consistent Performance..



CARTOSE* has won steadily increasing recommendation by physicians because it has always stood the test of performance as a carbohydrate milk modifier for infant feeding.

Babies thrive on CARTOSE because.

CARTOSE is well tolerated; gastro-intestinal discomfort is minimized by its mixed carbohydrate content;

CARTOSE is liquid, facilitating rapid, exact formula preparation;

CARTOSE is compatible with any formula base—fluid, evaporated, or dried milk;

CARTOSE is pure; it is prepared and bottled by a sterilizing process.

SUPPLIED: In clear glass bottles containing 1 pt. Two tablespoonfuls (1 fl. oz.) provide 120 calories. Available through recognized pharmacies only.

ACCEPTED Council on Foods and Nutrition A.M.A.

CARTOSE
REG. U. S. PAT. OFF.
A Mixed Carbohydrate

*The word CARTOSE is a registered trademark of H. W. Kinney & Sons Inc.

— H. W. KINNEY & SONS, INC. — Kinney REG. U. S. PAT. OFF. — COLUMBUS, INDIANA —



Formulac— a modern infant food

FORMULAC Infant Food is a concentrated milk in liquid form, fortified with all vitamins known to be necessary to adequate infant nutrition. No supplementary vitamin administration is required.

By incorporating the vitamins into the milk itself, the risk of human error or oversight is reduced. FORMULAC contains sufficient B complex, Vitamin C in stabilized form, Vitamin D (800 U.S.P. units), copper, manganese and easily assimilated ferric lactate—rendering it a flexible formula basis both for normal and difficult feeding cases. The only carbohydrate in FORMULAC is the natural lactose found in cow's milk. *No carbohydrate has been added.*

FORMULAC, a product of National Dairy research, has been tested clinically, and proved satisfactory. It is promoted to the medical profession alone. FORMULAC is on sale at grocery and drug stores nationally.

• For further information about FORMULAC, and for professional samples, mail a card to National Dairy Products Company, Inc., 230 Park Avenue, New York 17, N. Y.



Distributed by **KRAFT FOODS COMPANY**

NATIONAL DAIRY PRODUCTS COMPANY, INC.

NEW YORK, N.Y.

use of bichloride of mercury and complain of the corrosive action on gold rings. Boric acid has been used for the treatment of diaper rash. It is safe but has not been found efficacious by most observers.

We have been searching for a safe and efficient bactericide against *Bacillus ammoniagencs*. The results with one of the quarternary ammonium compounds, para di-isobutyl-cresoxy-ethoxy-ethyl di-methyl benzyl ammonium chloride monohydrate, warrant early report. This drug was supplied to us as Diapene.*

PLAN OF STUDY

The bactericidal action of Diapene was tested in vitro on *B. ammoniagenes*. Contact tests with concentrated solutions of the drug were made on our own skins and then on children, infants, and newborn infants. Children with diaper rash were treated by impregnating the diapers with Diapene.

RESULTS

The bactericidal effect of Diapene on *B. ammoniagenes* in vitro is found in Tables I and II. The cup-plate method indicates inhibition up to 1:110,000. The tube method, which is more accurate, shows the bactericidal action up to approximately 1:200,000. The drug performs slightly better at body temperature than room temperature.

TABLE I. EFFECT OF DIAPENE ON B. AMMONIAGENES

CUP-PLATE METHOD OF TESTING (EXTRACT AGAR MEDIUM)	
DILUTION OF DRUGS	INHIBITION ZONE (DIAMETER IN MM. BEYOND CUP)
1: 1,000	70
1: 10,000	40
1: 20,000	32
1: 30,000	31
1: 40,000	28
1: 50,000	24
1: 70,000	23
1: 80,000	23
1: 90,000	20
1:100,000	17
1:110,000	Very slight
1:120,000	No inhibition
1:130,000	No inhibition
1:140,000	No inhibition
1:150,000	No inhibition
1:200,000	No inhibition

*Amount of drug solution tested per cup, 0.2 c.c. Diameter of cup, 15 mm.

In Table III are the results of an experiment on the inhibition of ammonia formation. Two diapers were soaked in 1:10,000 dilution of Diapene, wrung out, and dried thoroughly. Two diapers were untreated. Sheets of heavy filter paper somewhat smaller in area than the diaper were soaked in filtered urine, placed on all diapers, and inoculated with 2 c.c. of a heavy suspension of organisms in urine. Diapers and filter papers were folded together and placed in a can to cut down evaporation (not airtight) and incubated at 37° C.

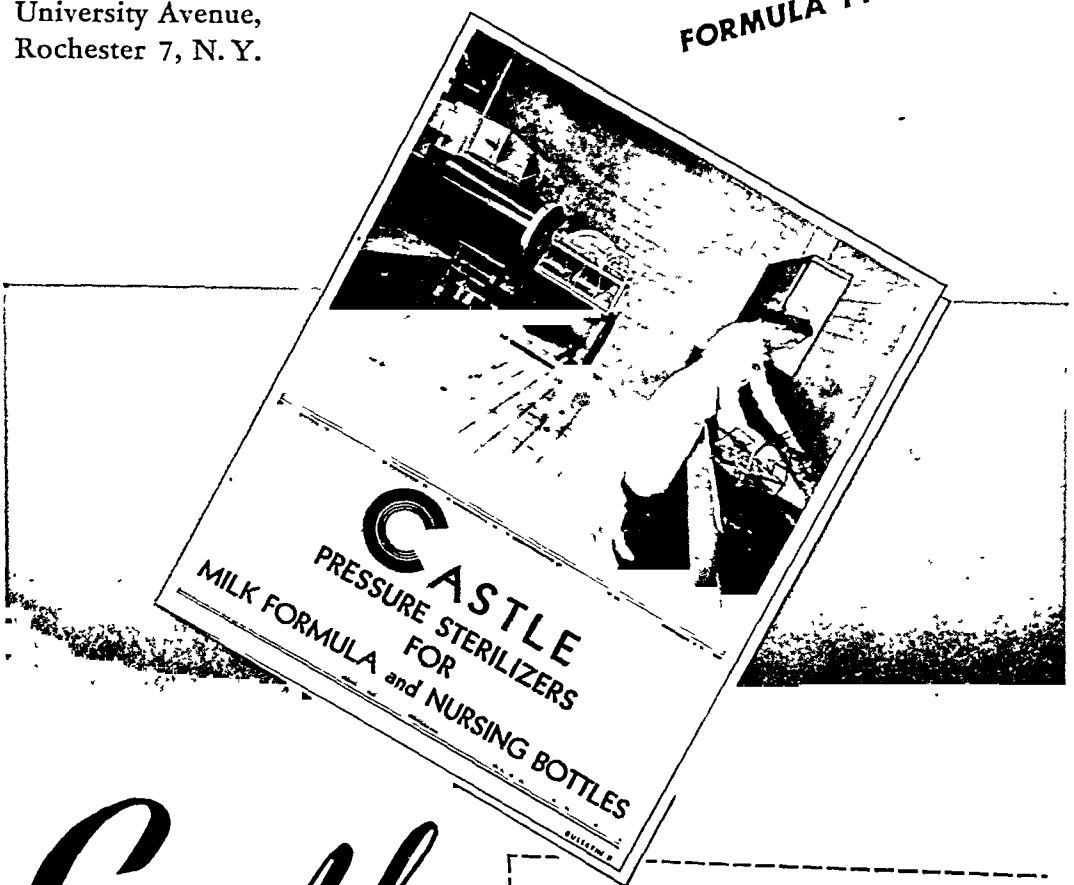
*Diapene is a product of Homemakers' Products Corporation.

PREVENT *Infant Gastro-Intestinal Infection*

Castle's new streamlined technique for sterilizing Milk Formula under pressure . . . with a central control that eliminates separate handling . . . brings new safety and efficiency to your hospital nursery.

For full details, send for Castle Bulletin "R". No obligation. Wilmot Castle Company, 1268 University Avenue, Rochester 7, N. Y.

WITH CASTLE'S NEW TECHNIQUE FOR MILK FORMULA PREPARATION



Castle

LIGHTS AND STERILIZERS

Pioneers in Sterilizing Safety

Since 1883...

WILMOT CASTLE CO.
1268 University Ave., Rochester 7, N. Y.
Please send Castle Bulletin "R".

Name.....

Hospital .....

Street .....

City ..... State.....

The results in the fifty children were recorded after three and seven days of treated diapers. In three days thirty-one of the youngsters improved so that the ammonia dermatitis was definitely receding. In eighteen children the dermatitis could be considered cleared. In one, there was no response. After one week of treatment, forty-nine children were considered cleared; the one did not clear. Fourteen of the infants, after stopping the treatment, returned in two to four weeks with a mild ammonia dermatitis. Once more they responded immediately to the impregnated diapers Nine of the mothers spontaneously said they no longer smelled ammonia in the diaper after treatment. Most of the others made the same statement, but only after direct questioning.

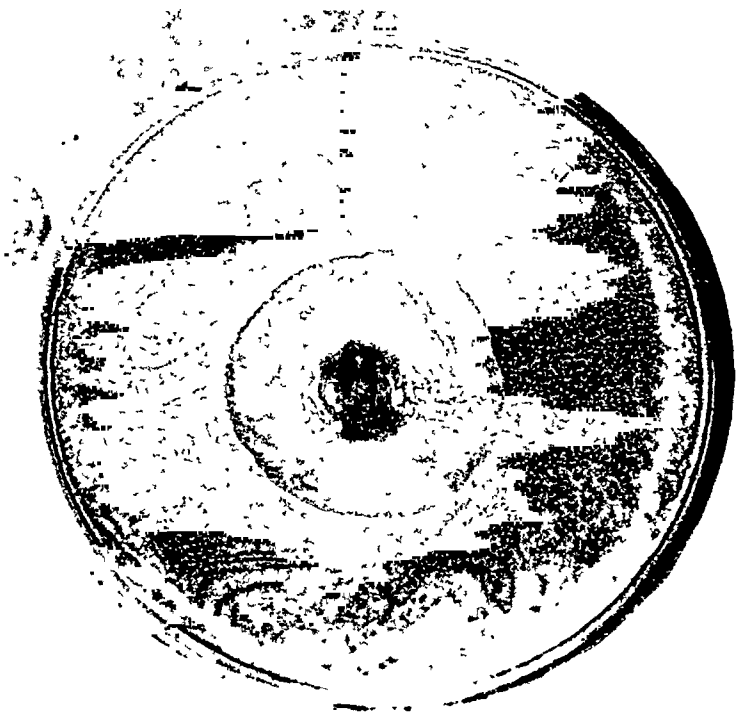


Fig. 1.—Dark area surrounding cup containing Diapene shows inhibition of the growth of the *B. ammoniagenes*

COMMENT

In the past we have used bichloride of mercury or boric acid to impregnate the diapers of children with ammonia dermatitis. The value of the boric acid was slight and probably due to the more frequent changing of the infant's diapers. Mercuric chloride, 1:4,000 solution, has proved to be an effective antiseptic against *B. ammoniagenes*. A new bactericide should have equal or better efficacy and none of the disadvantages of mercuric chloride.

The marked bactericidal effect of Diapene on *B. ammoniagenes* in vitro has been confirmed clinically. It is our impression that Diapene has as much or more efficacy than mercuric chloride in ammonia dermatitis. Further-

In Eczema, Psoriasis, and Other Stubborn Skin Lesions

This

CLEANER, GENTLER, MORE EFFECTIVE



Medication . . .

So dependably non-irritant that it is safely used on the tender skin of infants . . .

So "clean" in its application that it is not only non-staining and non-soiling, but leaves no trace upon the skin...

So high in its concentrations of unsaturated hydrocarbons and sulfur compounds that it presents a remarkably high therapeutic efficacy . . .

Tarbonis—a unique extraction product of selected tars made by a process distinctly its own, incorporated in a vanishing-type cream—has freed tar therapy from its former objectionable features. Its prompt patient acceptance and co-operation assures the uninterrupted treatment so essential in eczema, psoriasis, seborrheic dermatitis, folliculitis, and in the many other dermal affections in which tar is indicated. • When infection complicates skin lesions, Sul-Tarbonis—incorporating 5 per cent sulfathiazole in Tarbonis—is indicated.

Physicians are invited to send for samples and literature.

THE TARBONIS COMPANY
4300 Euclid Avenue Cleveland 3, Ohio

Tarbonis is packaged in 2¼ oz., 8 oz., 1 lb., and 6 lb. jars.

TARBONIS

SUL-TARBONIS

Sul-Tarbonis is supplied in 2¼ oz. and 1 lb. jars.

SUMMARY

1. The efficacy of Diapene in ammonia dermatitis has been studied.

2. Diapene combines a high bactericidal effect against *B. ammoniagenes* with no irritation of the infant's skin.

3. Forty-nine infants with ammonia dermatitis were cleared within one week by impregnating their diapers with Diapene.

REFERENCES

1. a. Cooke, J. V.: Am. J. Dis. Child. 22: 481, 1921.
b. Cooke, J. V.: Arch. Dermat. & Syph. 14: 539, 1926.
c. Cooke, J. V.: Brennemann, Practice of Pediatrics 4: Chapter 41, 1945.
2. Gordon, I.: Brit. M. J. 1: 383, 1940.



of agreement

Pediatricians and geriatricians agree upon the need for prompt control of cough because its effects are particularly exhausting upon the child and the aged.

EXPERIMENTAL STUDIES

Limitations of the Oral Route for Sulfadiazine Administration.—In order to determine the ability of the infantile gastrointestinal tract to absorb sulfadiazine, single doses several times as large as those routinely employed were given by mouth to a group of infants and the blood levels followed closely for the next eight hours (Fig. 1). The subjects were convalescing from infectious diseases or from surgical procedures; none was acutely ill at the time of the experiment. In only one of the infants, a 2-year-old child, did the blood level exceed 12.5 mg. per cent; in two of them (subjects 3 and 4) it approximated the levels usually noted with the standard initial therapeutic dose of 0.1 Gm. per kilogram body weight.

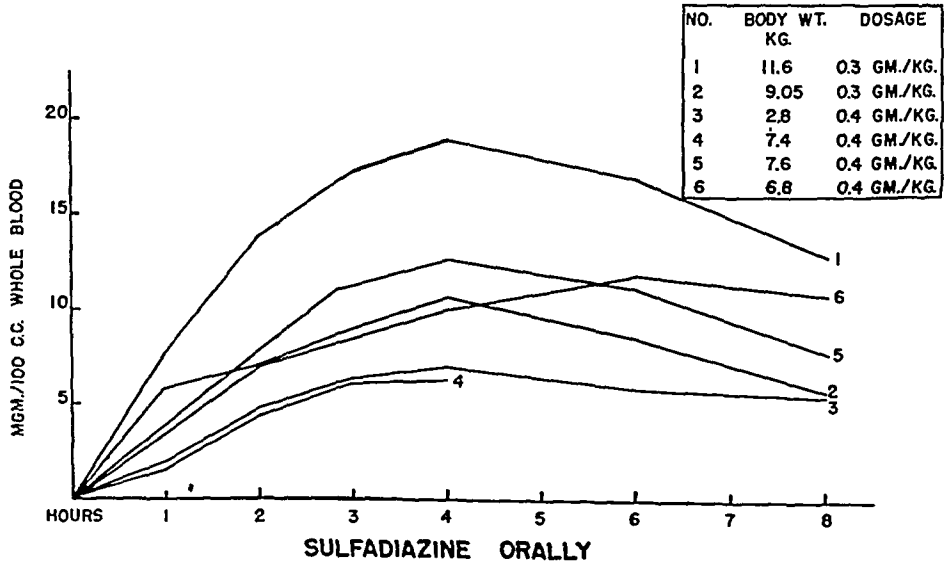


Fig. 1.—Whole blood concentrations of sulfadiazine following single large doses of sulfadiazine in infants.

A high blood level, already present by virtue of parenteral administration, cannot be maintained by oral administration in the majority of young children. Fig. 2 is representative of the course of the blood sulfadiazine level in the infant when parenteral therapy is stopped; even huge oral doses (0.8 Gm. per kilogram body weight per day) failed to prevent an immediate drop in the blood level when the subcutaneous route was abandoned.

It is evident that there are certain limitations, at least in young children, to the oral use of sulfadiazine in the usual form.

Results of Single Subcutaneous Dose of Sodium Sulfadiazine.—The subjects for these experiments were infants or young children with acute infections of various types, the subcutaneous dose of sulfadiazine being given as the initial part of their chemotherapeutic regime. Fig. 3 illustrates the whole blood concentration produced by varying amounts of sodium sulfadiazine administered

FACTS for doctors and dietitians on special diets in which the use of an enriched, easily prepared cereal of high nutritive value is indicated.

Is there an ideal cereal for infant feeding?



For over 50 years Cream of Wheat has been recommended as an excellent first solid food for babies. It provides important nutrients in a form easily digested by infants and small children. It is also useful in certain nutritional and digestive disorders.

IRON. "Enriched 5 Minute" Cream of Wheat is an excellent source of well-utilized Iron for infants. An average serving (two level tablespoons, dry weight—20 grams) provides 8.5 mg. of Iron—110% of the recommended daily minimum requirement for children under 6* and 83% for those over 6.

Clinical tests prove this cereal, fed infants between 3 and 5 months old as the first soft solid food, is a satisfactory source of Iron. It is very valuable in cases of nutritional anemia (often found in infants from 4 to 14 months old). The Iron in "Enriched 5 Minute" Cream of Wheat is as available as medicinal Iron (ferrous sulphate) and essentially as effective.

VITAMINS. "Enriched 5 Minute" Cream of Wheat provides whole wheat amounts of B_1 (Thiamine); also contains Niacin Vitamin. An average serving (two level tablespoons, dry weight—20 grams) supplies 40% of recommended daily minimum requirement of B_1 for infants, 20% for children under 6, 12% for those over 6.

CALCIUM: PHOSPHORUS. An average serving of "Enriched 5 Minute" Cream of Wheat (two level tablespoons, dry weight—20 grams) provides 12% of recommended daily minimum requirement of Calcium; 14% of that of Phosphorus for children.* Extensive tests show the Calcium and Phosphorus are utilized fully as well as the corresponding elements contained in milk. Another study has revealed that the ingestion of the cereal by infants slightly increased the serum calcium level.

EASY DIGESTIBILITY. Clinical tests prove that only 5 minutes' boiling is required to fully break down the starch cells in "Enriched 5 Minute" Cream of Wheat. Longer cooking is not necessary, even for use in infant formulas or as a starting cereal.

Complete digestion of "Enriched 5 Minute" Cream of Wheat was checked by microscopic examination of stools of small infants (3 weeks to 6 months). No raw starch granules were in the stools when this cereal (boiled only 5 minutes over open flame) was used as the one source of starch. Test included formulas and solid food.

SPECIAL USES. "Enriched 5 Minute" Cream of Wheat's high content of available Iron is useful in preventing nutritional anemia in infancy. In pyloric spasm, thick formulas which use this cereal provide nourishment in a well-retained form. In diarrhea, the cereal's very low crude fiber content (1 part in 200) makes it possible to provide important nutrients without rough, irritating particles.

* Minimum daily requirement for infants not established by U. S. Government. One average serving of "Enriched 5 Minute" Cream of Wheat supplies more than the full daily minimum of Iron and [illegible] of the daily [illegible] recommended by [illegible] Council.

NOTE: For free booklet on use of "Enriched 5 Minute" Cream of Wheat in infant feeding, diets for expectant mothers, diets for the aged and bland diets, plus free sample package of the cereal (4-6 servings), write: The Cream of Wheat Corporation, 742 Stinson Blvd. Minneapolis 13 Minnesota.

"Cream of Wheat" Trademark Reg. U. S. Pat. Off.

not appear to be any more effective than does a comparable amount given by mouth. When the doses are calculated on the basis of body weight for the adults (subjects 8, 9, and 10), they are found to range between 0.04 and 0.09 Gm. per kilogram. In comparison with similar amounts given to children, as illustrated in Fig. 3, the absorption in adults is seen to be considerably slower, for the blood level is still rising at the end of eight hours, whereas in the children the peak of absorption appears at two hours.

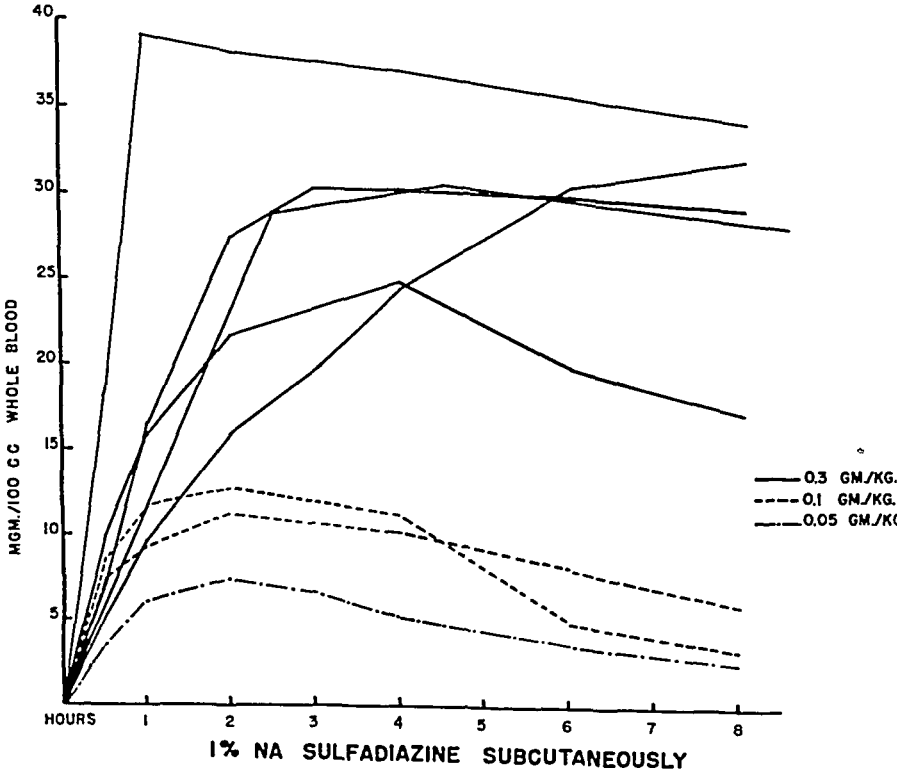


Fig. 3.—Whole blood concentrations of sulfadiazine following single subcutaneous doses of varying amounts of sodium sulfadiazine in 1 per cent solution to a group of infants and children.

Fig. 5 illustrates the course of the blood level following a dose of 10 Gm. administrated subcutaneously as a 1 per cent solution to three adults, this dose corresponding to 0.13 to 0.17 Gm. per kilogram body weight. Somewhat higher blood levels resulted, but here, too, absorption seemed to be definitely slower than in the case of the children.

The results of the subcutaneous administration of varying amounts of a 5 per cent solution of sodium sulfadiazine to a group of three young children are presented in Fig. 6. With the use of large doses, absorption seems to be a little more rapid than with the 1 per cent solution, while with doses of 0.1 Gm. per kilogram the two solutions are similarly absorbed. Accurate comparison can hardly be made, however, from the data at hand.

The Journal of Pediatrics

VOL. 31 OCTOBER, 1947 NO. 4

Original Communications

A NEW TREATMENT FOR DIAPER RASH

PRELIMINARY REPORT

REUEL A. BENSON, M.D., LAWRENCE B. SLOBODY, M.D., LOIS LILLICK, PH.D., ANTHONY MAFFIA, M.D., AND NORBERT SULLIVAN, M.D.
NEW YORK, N. Y.

DIAPER rash is the most common skin condition encountered in infants and young children. It is a dermatitis which is usually limited to the skin in contact with the wet diaper: the buttocks, thighs, genitalia, and lower abdomen. The lesions are characteristically erythematous or papulovesicular and may go on to ulceration. Ulceration of the external urinary meatus is particularly troublesome.

In 1921 Cooke[1] demonstrated classically that the ordinary diaper rash is an ammonia dermatitis. He has shown that "the cause of the NH_2 production is entirely due to bacterial decomposition of urinary urea into free ammonia. and the principal organism concerned is the *B. ammoniagenes,* a saprophytic gram-positive bacillus which originates in the feces and infests the skin of the diaper region. When the diaper is wet by urine, a good culture medium is furnished with a favorable T° for their growth, and abundant ammonia production follows. The strong odor as well as the skin irritation are commonly noted in the morning after the child has lain in a wet diaper for some hours."

It follows that "the prevention and treatment of ammonia dermatitis is dependent on preventing ammonia formation in the diaper by inhibiting bacterial growth and this is readily accomplished by the use of a nonvolatile antiseptic in the diaper itself." Cooke initiated the use of 1:4,000 bichloride of mercury as a final rinse for the diapers. Physicians for many years have found this antiseptic prevents bacterial growth and ammonia formation. With the elimination of the cause of the skin irritation, the eruption disappears rapidly. Bichloride of mercury is not an ideal antiseptic because of its well-known poisonous qualities. Gordon[2] hesitates to recommend it for this reason and because of the difficulty of insuring the correct concentration. The laity fear the

From the Departments of Pediatrics and Bacteriology, New York Medical College, Flower and Fifth Avenue Hospitals
Aided by a grant from Homemakers' Products Corporation, New York, N. Y.

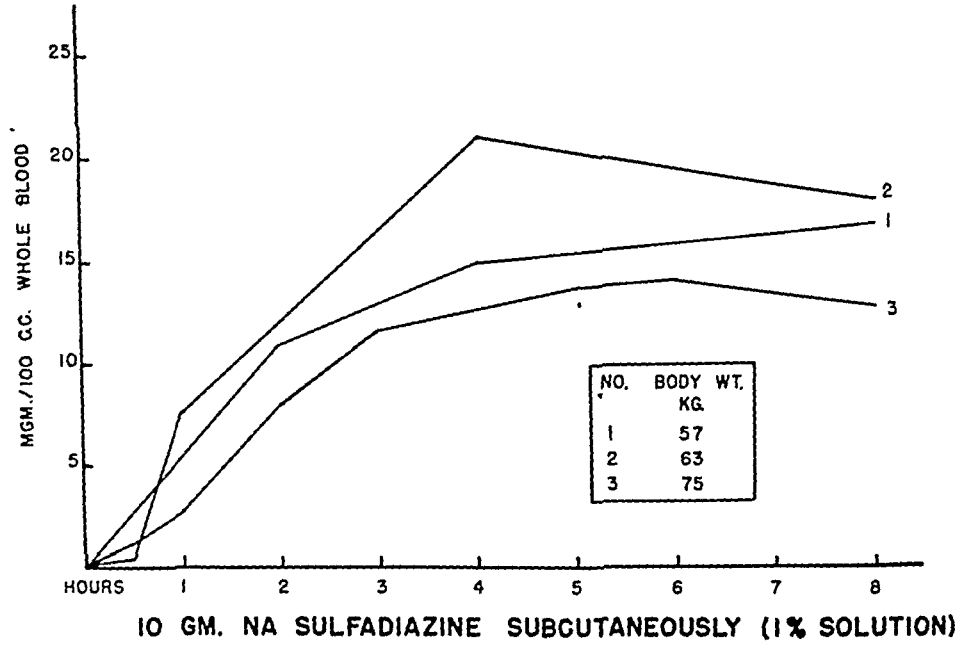


Fig. 5.—Whole blood concentrations of sulfadiazine following a single 10 Gm. dose given subcutaneously as a 1 per cent solution to a group of adults.

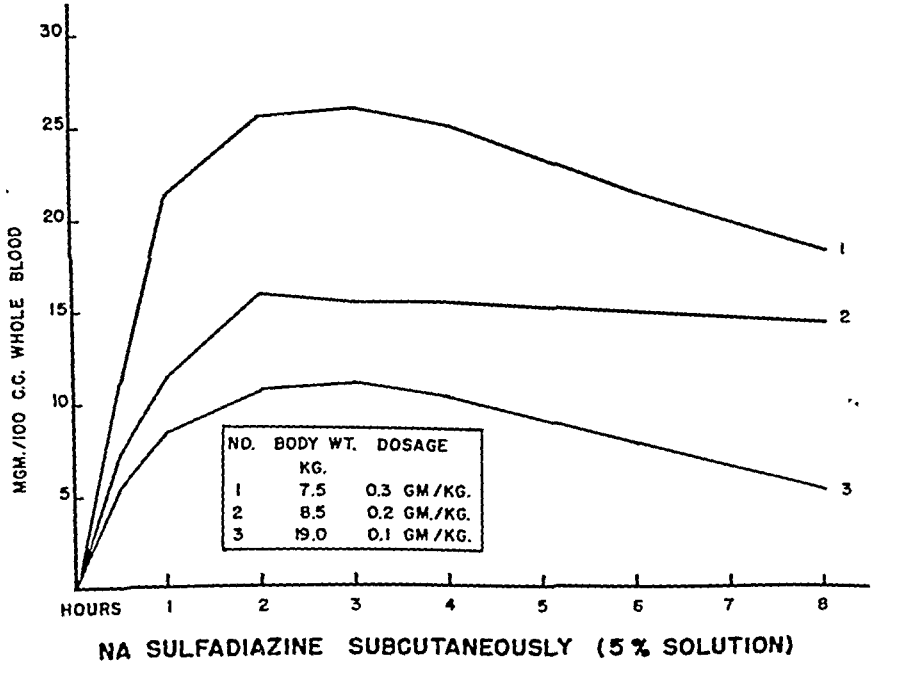


Fig. 6.—Whole blood concentrations of sulfadiazine following the subcutaneous administration of varying amounts of a 5 per cent solution of sodium sulfadiazine to a group of infants.

TABLE II. EFFECT OF DIAPENE ON B. AMMONIAGENES

TUBE METHOD (EXTRACT BROTH MEDIUM)*		
DILUTION OF DRUG	BROTH CULTURE AT 37° C.	BROTH CULTURE AT ROOM TEMPERATURE
1: 50,000	No growth	No growth
1:100,000	No growth	No growth
1:110,000	No growth	No growth
1:120,000	No growth	No growth
1:130,000	No growth	No growth
1:140,000	No growth	No growth
1:150,000	No growth	No growth
1:160,000	No growth	No growth
1:180,000	No growth	No growth
1:200,000	No growth	Slight growth
1:500,000	No growth	Slight growth
Control	Heavy growth	Heavy growth

*Incubation at 37° C. and at room temperature for forty-eight hours.

TABLE III. AMMONIA FORMATION IN DIAPERS

	AFTER 15 HOURS	AFTER 20 HOURS
Two diapers treated with Diapene	No odor of NH_3	Odor of NH_3, not strong
Two untreated diapers	Strong NH_3 odor	Strong odor of NH_3

The diapers impregnated with Diapene did not develop an ammonia odor until after fifteen hours. By twenty hours the treated diapers had a faint odor of ammonia. The controls had a strong ammonia odor at fifteen and twenty hours.

The safety of Diapene on human skin was established by contact tests. First the powder was placed on our forearms and moistened. No irritant effects were noted. Then 180 children and infants and twenty newborn infants received patch tests soaked with a 1:5,000 solution. The patch was a 1″ square gauze which remained wet and in contact with the skin for twenty-four hours. No irritating effects on the skin were noted in any child, infant, or newborn infant. Of these infants and children, one hundred had the patch test repeated in ten days. There was no reaction.

Fifty infants with ammonia dermatitis have been treated with Diapene. The results are found in Table IV. The infants ranged in age from 1 month to 18 months of age. No mild cases were included in this series. Moderate rash denotes marked erythema or papulovesicular lesions. Severe rash indicates those which have gone on to ulceration.

The only treatment was impregnating the diaper with Diapene. The Diapene was supplied in the form of tablets. One tablet in 2 quarts of water provided an approximately 1:25,000 solution. Up to six washed diapers were placed in a basin and the solution poured over them. The diapers were permitted to soak for ten minutes, then wrung out and hung up to dry. These instructions should be followed to insure approximately equal concentrations in each diaper. Diapene is absorbed from solution by diapers almost quantitatively irrespective of the concentration of the solution. If diapers were introduced one at a time, all the Diapene might be absorbed on the first diaper placed in the solution.

7 illustrate nicely the constancy of the equilibrium concentration of sulfadiazine in the blood attained in six to eight hours, which is independent of the mode of administration of the drug.

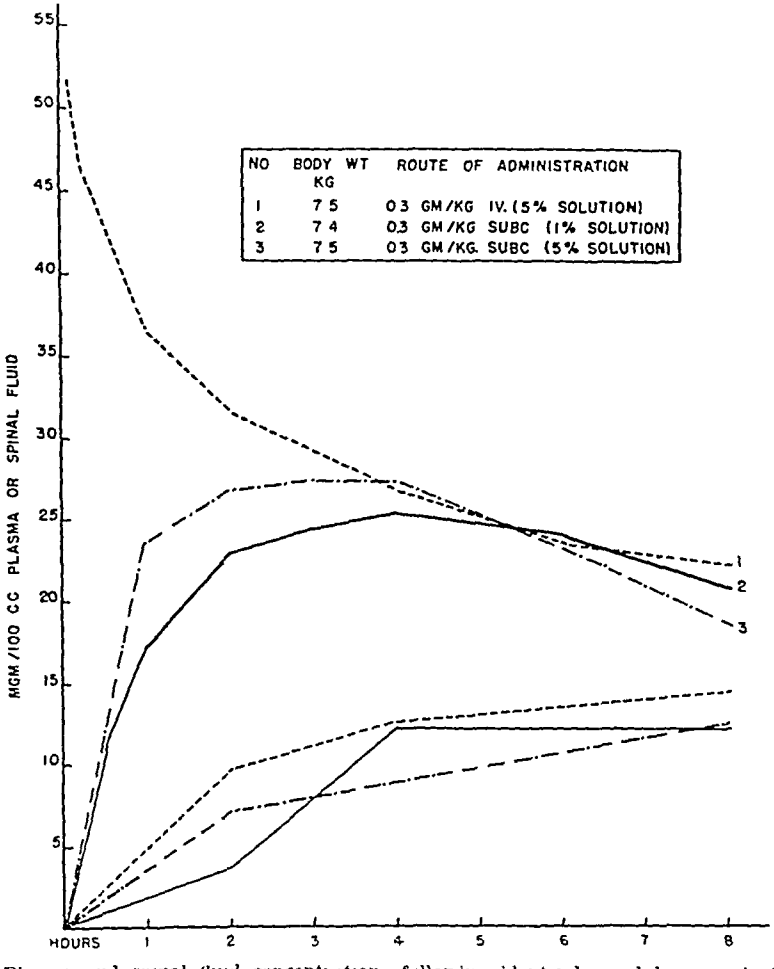


Fig. 8.—Plasma and spinal fluid concentrations following identical per kilogram single doses administered intravenously and subcutaneously to the same patient on different days.

All of our data in regard to accurately timed simultaneous observations on the concentrations of sulfadiazine in the plasma and cerebrospinal fluid of patients receiving single parenteral doses of sodium sulfadiazine, either subcutaneously or intravenously, are plotted in Fig. 9*A*, and 9*B*. In these figures the observations at two, four, and eight hours subsequent to the injection of the sodium sulfadiazine solution are indicated by small and large dots or circles, the plasma concentrations on the ordinates being plotted against the spinal fluid concentrations on the abscissae. Equations were calculated to represent each series of plotted points by the method of least squares, and these equations together with the curves they represent are shown in each figure. Admittedly,

TABLE IV. CHILDREN TREATED WITH DIAPENE

	NAME	SEX	RACE	AGE (MO.)	SEVERITY OF RASH	RESULTS AFTER 3 DAYS	RESULTS AFTER 7 DAYS
1.	V. S.	M	W	18	Moderate	Improved	Cleared
2.	R. M.	F	W	6	Severe	Improved	Cleared
3.	D. G.	F	W	12	Moderate	Improved	Cleared
4.	S. R.	F	W	11	Severe	Cleared	Cleared
5.	V. N.	F	W	3	Moderate	Improved	Cleared
6.	C. R.	M	W	1	Moderate	Improved	Cleared
7.	M. R.	F	W	12	Moderate	Improved	Cleared
8.	C. W.	M	N	2	Moderate	Improved	Cleared
9.	K. C.	F	W	2	Severe	Improved	Cleared
10.	D. S.	M	W	1	Severe	Cleared	Cleared
11.	C. H.	F	W	1	Severe	Cleared	Cleared
12.	E. G.	F	W	4	Moderate	Cleared	Cleared
13.	M. G.	F	W	4	Moderate	Cleared	Cleared
14.	M. C.	F	W	10	Very severe	Cleared	Cleared
15.	C. L.	M	N	2	Moderate	Improved	Cleared
16.	C. L.	F	N	2	Moderate	Improved	Cleared
17.	A. K.	M	W	3	Severe	Improved	Cleared
18.	A. C.	M	W	1	Moderate	Improved	Cleared
19.	F. S.	M	W	4	Moderate	Improved	Cleared
20.	R. B.	M	N	4	Severe	Improved	Cleared
21.	L. D.	M	W	7	Severe	Improved	Cleared
22.	L. B.	F	W	1	Moderate	Improved	Cleared
23.	J. K.	M	W	1	Moderate	Improved	Cleared
24.	L. B.	M	N	6	Moderate	Improved	Cleared
25.	V. P.	F	W	2	Moderate	Improved	Cleared
26.	C. A.	F	W	5	Severe	Improved	Cleared
27.	L. T.	F	N	6	Severe	Improved	Cleared
28.	M. L.	M	W	4	Moderate	Cleared	Cleared
29.	T. A.	M	W	7	Moderate	Cleared	Cleared
30.	P. M.	F	W	5	Moderate	Cleared	Cleared
31.	E. W.	F	W	22	Moderate	Cleared	Cleared
32.	E. M.	F	W	9	Very severe	Cleared	Cleared
33.	R. R.	M	W	26	Moderate	Not improved	Not improved
34.	L. S.	F	W	8	Severe	Improved	Cleared
35.	J. D.	M	W	2	Moderate	Cleared	Cleared
36.	R. C.	F	W	4	Moderate	Improved	Cleared
37.	C. C.	F	W	13	Moderate	Improved	Cleared
38.	H. M.	F	W	18	Severe	Improved	Cleared
39.	D. C.	M	N	4	Moderate	Cleared	Cleared
40.	M. R.	M	W	10	Moderate	Improved	Cleared
41.	L. S.	F	W	13	Moderate	Cleared	Cleared
42.	J. S.	F	W	9	Moderate	Improved	Cleared
43.	R. P.	M	W	4	Severe	Improved	Cleared
44.	C. W.	M	N	8	Moderate	Cleared	Cleared
45.	R. V.	M	W	1	Moderate	Cleared	Cleared
46.	F. F.	F	W	6	Moderate	Improved	Cleared
47.	H. A.	F	W	17	Moderate	Cleared	Cleared
48.	F. M.	M	W	10	Moderate	Cleared	Cleared
49.	R. D.	F	W	5	Moderate	Improved	Cleared
50.	M. M.	M	W	4	Moderate	Improved	Cleared

more, if resistant rashes were encountered, the solution could be concentrated five times with no irritant effects on the skin.

In the treatment of ammonia dermatitis, all the diapers should be impregnated. In the prevention it is possible that only the night diapers would have to be treated. Usually the lying for long periods in the wet diaper loaded with NH_3 initiates the dermatitis. Our experiments (Table III) have shown that the Diapene-impregnated diaper will not develop an ammonia odor for at least fifteen hours.

It has been our practice to utilize this route for any patient in whom it is desired to establish quickly and thereafter maintain high blood sulfonamide concentrations, for those who are comatose or who vomit excessively, and for the young infant who is severely toxemic on admission to the hospital. Solutions of sodium sulfadiazine in 0.5 and 1.0 per cent strength are well tolerated by the

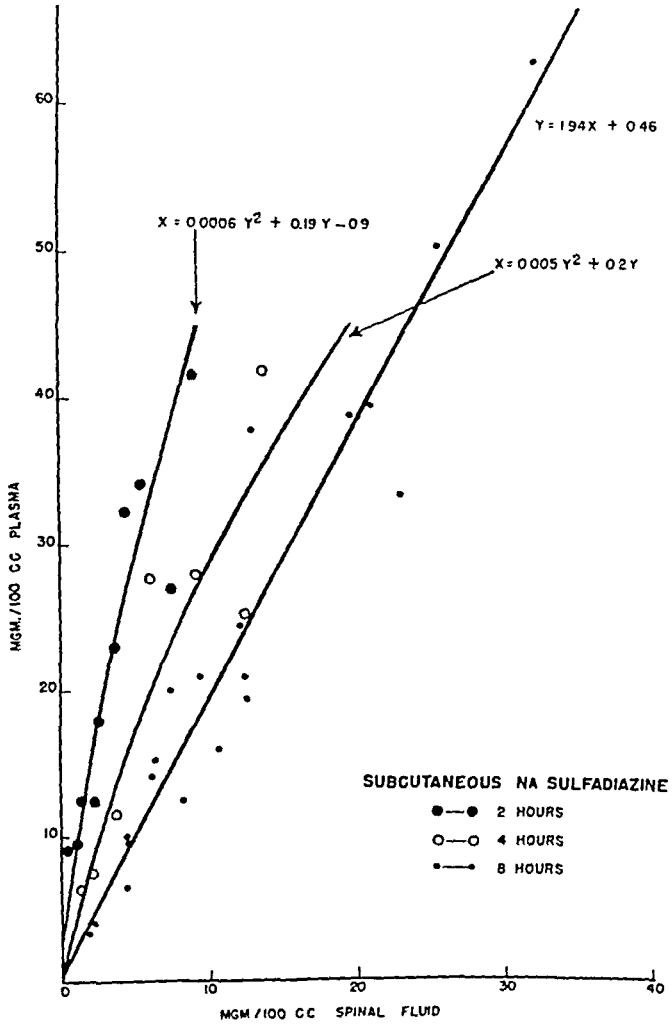


Fig. 9.1.

Fig. 9.—The plasma-spinal fluid distribution of sulfadiazine in a group of infants and children with meningeal infection at various times after the administration of sodium sulfadiazine *A.*, subcutaneously, and *B.*, intravenously. (*For Fig. 9B, see opposite page.*)

subcutaneous tissues, and pain is no greater than that accompanying other subcutaneous infusions. Our experience with solution strengths greater than 1 per cent has been quite limited, but it has been reported that 5 per cent solutions do not provoke untoward reactions.[7] The calcium salt of sulfadiazine appears

THE SUBCUTANEOUS ADMINISTRATION OF SODIUM SULFADIAZINE

GILBERT B. FORBES, M.D., GEORGE DONNELL, M.D., AND JOHN C. HERWEG, M.D.
ST. LOUIS, MO.

THE subcutaneous route for parenterally administering the sulfonamide drugs, first introduced by Taplin,[1] has been used almost exclusively at the St. Louis Children's Hospital since early in 1942. During the succeeding years we have collected data with regard to the subcutaneous use of the various sulfonamides, which it seems desirable to publish, in view of the general preference for the intravenous route and the occasional comment in the literature that the subcutaneous route is unsatisfactory. This report compares the subcutaneous and intravenous methods of administering sodium sulfadiazine to infants and children, with special reference to its diffusion into the cerebrospinal fluid. Data on the parenteral use of sodium sulfapyrazine[2] and sodium sulfamerazine[3] are available in previous publications from this clinic.

METHODS

The solutions of sodium sulfadiazine for subcutaneous use were prepared by adding sterile powdered sodium sulfadiazine to sterile one-half fortified lactate-Ringer's solution* in amounts sufficient to make either a 1 per cent or a 5 per cent solution. Those for intravenous use were made up in 5 per cent concentration in distilled water. The solutions were prepared aseptically and were not subjected to further sterilization procedures before use. They were discarded if not used within twenty-four hours. The subcutaneous injections were made either in the axillae or thighs and the solution allowed to run in by gravity as rapidly as possible without producing undue tissue distension. The intravenous injections were made in a scalp or antecubital vein at a fairly rapid rate, the time consumed in the largest single injection (100 c.c. in a 22.7 kg. subject) not exceeding ten minutes.

The patients employed for this study exhibited no evidence of renal or enteric disease. Samples of whole blood for sulfadiazine analysis were obtained from puncture of the toe or finger, those of plasma from oxalated venous blood. Lumbar punctures were done under local metycaine† anesthesia. Analyses were made for only the "free" form of the drug, and all figures given herein refer to this form. Chemical analyses were made by the method of Bratton and Marshall[4] adapted for a sample of 0.1 c.c. The readings were made on an Evelyn photoelectric colorimeter and compared to a standard curve made, and periodically checked, in this laboratory.

From the Department of Pediatrics, Washington University School of Medicine, and the St. Louis Children's Hospital.

A portion of the sodium sulfadiazine used in this study was kindly furnished by the Medical Research Division of Sharp & Dohme, Inc.

*A mixture of three parts 1/6 molar sodium lactate with four parts Ringer's solution. The pH of this solution, as prepared at the St. Louis Children's Hospital, is slightly above 7.0.

†Benzoyl-gamma-2-methyl piperidino propanol hydrochloride.

Third, the initial, and unnecessarily high, spike in the blood sulfonamide concentration which follows intravenous injection is avoided. After subcutaneous injection the blood level rises to the desired value rather than falling to it as is the case with an intravenous injection. With comparable dosage, the attained blood level at the end of six to eight hours is similar with the two methods of administration. Many patients requiring parenteral chemotherapy are dehydrated on admission to the hospital and, therefore, should receive an intravenous injection of glucose or some other fluid in order to augment blood volume and promote diuresis prior to intravenous chemotherapy with its attendant high blood levels. In a chemotherapeutic sense, this maneuver wastes valuable time. These difficulties inherent in the intravenous method could no doubt be avoided by administering the drug solution as a continous intravenous drip, yet from a consideration of the technical difficulties involved in the setting up and proper maintenance of the necessary apparatus, at least in infants and young children, this method would offer no advantage over the subcutaneous route.

After witnessing two instances of osteomyelitis incurred at another hospital from the use of tibial marrow infusions, we have also been reluctant to adopt that method of fluid administration.

Although we have preferred to use a mixture of 1/6 molar sodium lactate and Ringer's solution as a vehicle for the subcutaneously administered solution of sodium sulfadiazine, isotonic saline or plain Ringer's solution may be used for this purpose. It is best to avoid the admixture of glucose as it may react chemically with sulfadiazine, particularly if the solution is heated. Since sodium sulfadiazine is unstable in boiling water, it is desirable to purchase either the sterile sodium sulfadiazine powder or a sterile 10 per cent solution from the manufacturer rather than attempt to sterilize the solutions as they are prepared. The solutions should be discarded if not used within twenty-four hours.

When sodium-lactate is used as the vehicle, one further precaution is necessary. To avoid the possibility of the undesirable presence of free lactic acid, one must be certain that the solution pH is greater than 6.5, preferably above 7.0, before adding sodium sulfadiazine. At a pH of below about 6.5 there will be enough free lactic acid to convert sodium-sulfadiazine into the free form which has a solubility of only 12.3 mg. per 100 c.c. Precipitation will then occur and render the solution worthless. For a similar reason sodium-sulfadiazine solutions should not be mixed with Amigen, which contains free amino acid. This problem has arisen because of the objectionable practice of some commercial firms in preparing sodium lactate solutions at an acid pH; it may be overcome by adjusting the pH with concentrated sodium hydroxide, using phenol red as an indicator, before the admixture of sodium sulfadiazine.

While there is a definite lag in the establishment of spinal fluid concentrations of sulfadiazine with the subcutaneous route of administration, as compared to the intravenous, the magnitude of this lag would not necessarily preclude

in 1 per cent solution to eight different subjects.* While doses of 0.1 and 0.05 Gm. per kilogram body weight do not result in unusually high levels, a dose of 0.3 Gm. per kilogram regularly effects a rapid rise in the blood concentration. In each of the five subjects in this latter group the blood level was 10 mg. per cent or above at the end of an hour, and in four of the five it exceeded 20 mg. per cent within two hours of the start of the subcutaneous infusion.

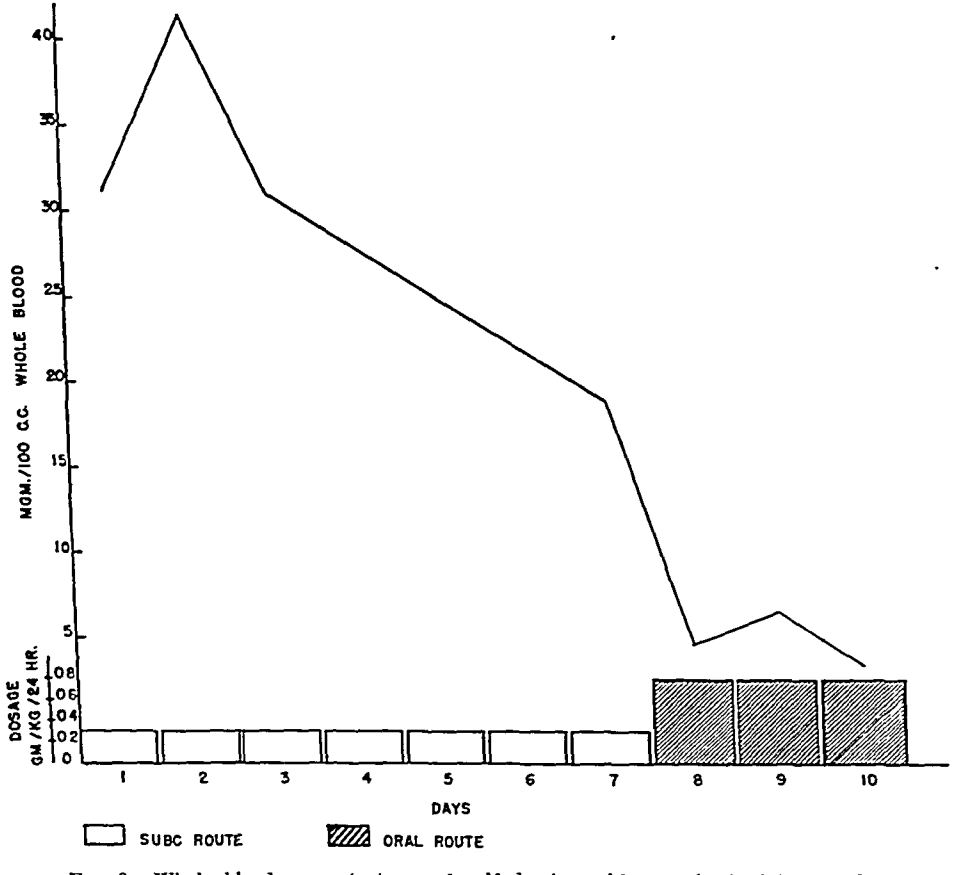


Fig. 2.—Whole blood concentrations of sulfadiazine with sustained high oral dosage in an infant whose blood level was originally raised to a high value through the subcutaneous administration of sodium sulfadiazine.

In one subject, who was dehydrated at the time of the infusion, absorption was extremely rapid, the blood level reaching 18.2 mg. per cent within thirty minutes and 39 mg. per cent in one hour.

In Fig. 4, data obtained by giving single 5 Gm. doses of sodium sulfadiazine subcutaneously to a group of children and adults are presented. Except for subject 6, in whom absorption was poor, this dose produced a satisfactory high level in those subjects 25 kg. or less in weight. In heavier individuals it does

*In these and subsequent charts, zero time refers to the time at which the subcutaneous infusion was begun.

ordinary sulfadiazine.[6] From the reported difference in attained serum levels, however, it would not appear that levels of the magnitude indicated above could be easily reached through the oral use of the microcrystals. In treating critically ill patients, moreover, high blood levels should be attained quickly, and although continued large oral doses would undoubtedly result in time in high blood levels, this accomplishment would involve undue therapeutic delay.

Though the subcutaneous administration of dilute solutions is quite satisfactory for the great majority of clinical cases, there may be instances in which intravenous or subcutaneous administration of stronger solutions are to be preferred: the grossly edematous subjects in whom salt and water restriction are desirable, those who have suffered extensive burns leaving little subcutaneous tissue available, and the rare patient who has a fulminating infection—the Waterhouse-Friderichsen syndrome is a good example—for whom the hour or two required for the establishment of a high blood level via the subcutaneous route may be disastrous. Further, for those patients seen at home and for whom transportation to a hospital would involve some delay in the institution of parenteral chemotherapy, an intravenous injection can be made with the aid of less apparatus than that required for a subcutaneous infusion.

SUMMARY

1. The subcutaneous route for the administration of sodium sulfadiazine constitutes a satisfactory method for parenteral chemotherapy in infants and children. Blood sulfadiazine concentrations of any desired magnitude can be quickly achieved and easily maintained by this method. The intravenous route is indicated only under exceptional circumstances.

2. The limitations of the infantile gastrointestinal tract for the absorption of sulfadiazine requires that the drug be administered parenterally on many occasions.

3. Adult patients do not absorb sodium sulfadiazine from the subcutaneous tissues as readily as do infants and children.

4. The rate of diffusion of sulfadiazine from the plasma to the cerebrospinal fluid in patients with meningeal infection is somewhat slower following subcutaneous administration in comparison to the intravenous method. This lag is not of sufficient magnitude, however, to contraindicate the subcutaneous route for the great majority of patients with bacterial meningitis.

5. In addition to adequate chemotherapy, hydration of the patient and alkalinization of the urine may be accomplished concurrently via the subcutaneous route by proper adjustment of the volume of the solution and its content of sodium lactate.

The kindness of Dr. Richard Maxwell, on whose service at the St. Louis City Hospital some of our studies were made, is gratefully acknowledged.

REFERENCES

1. (a) Taplin, G. V., Jacox, R. F., and Howland, J. W.: J. A. M. A. 114: 1733, 1940.
(b) Taplin, G. V., Custer, E. A., and Young, L. E.: J. A. M. A. 121: 313, 1943.
2. Barnett, H. L., Perley, A. M., Forbes, G. B., and Goldring, D.: Am. J. M. Sc. 206: 599, 1943.

Diffusion of Sulfadiazine into the Cerebrospinal Fluid. —A study was made of the rapidity with which sulfadiazine enters the cerebrospinal fluid from the blood, with the idea in mind of comparing the intravenous and subcutaneous routes of administration. The subjects employed for this portion of the study were all suffering from pyogenic or tuberculous meningitis or meningoencephalitis at the time of the experiments. Samples of lumbar spinal fluid and of venous blood were obtained at regular intervals following the administration of sodium sulfadiazine. Plasma, rather than whole blood, analyses were run on these subjects, for it is the plasma sulfonamide concentration which controls the level in the extracellular fluid.

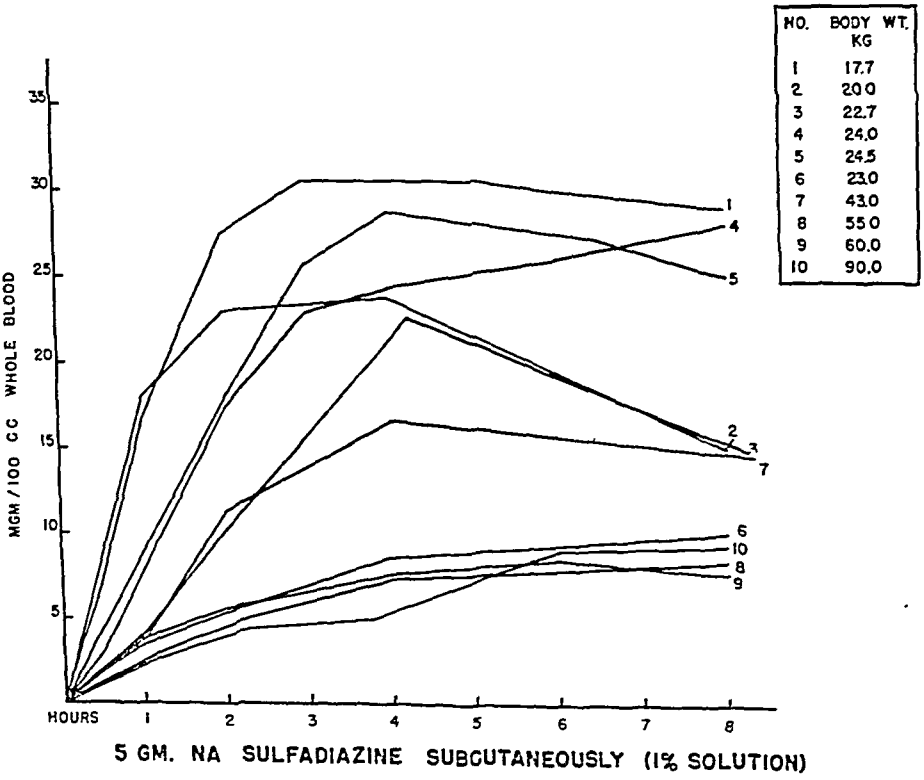


Fig. 4.—Whole blood concentrations of sulfadiazine following a single 5 Gm. dose given subcutaneously as a 1 per cent solution to a group of adults and children.

Two patients with chronic meningeal infection were given identical amounts of sodium sulfadiazine by the two routes on separate days. In Fig. 7 the results of giving a patient with meningoencephalitis 0.1 Gm. per kilogram of body weight by the intravenous and subcutaneous routes are illustrated. Despite the wide discrepency in plasma concentrations immediately following the injections (71.5 versus less than 1 mg. per cent), the concentrations at eight hours are almost identical. In sharp contrast, the spinal fluid concentrations do not differ greatly from each other at any time throughout the period covered by the experiment.

RHEUMATIC FEVER RECURRENCES IN CHILDREN WITHOUT SULFONAMIDE PROPHYLAXIS: AN EVALUATION OF ENVIRONMENTAL FACTORS

ROBERT L. JACKSON, M.D., HELEN G. KELLY, M.S., CECILIA HEALY ROHRET, M.A., AND JULIA M. DUANE, M.D.
IOWA CITY, IOWA

INTRODUCTION

RENEWED interest has been focused on the recurrence rate of rheumatic fever since the introduction of chemotherapeutic agents for prophylaxis. This study was undertaken to determine the recurrence rate of a group of rheumatic subjects who have received special attention to improve their diets and level of environmental care, but who have not received sulfonamide drugs to prevent intercurrent infections. From this study we hoped to evaluate the relation of environmental factors to the course of the disease and to learn whether a high level of general care is sufficient to protect the children from recurrences, or if some children also should receive chemotherapeutic agents for prophylaxis.

SUBJECTS

Many of the children with rheumatic fever living in Iowa come under the care and supervision of the University Hospital and the State Services for Crippled Children's mobile clinics held throughout the state. In this study of the recrudescence of rheumatic fever, 266 of these children were included because they met the requirements of having an established diagnosis of rheumatic fever, were instructed in the therapy prescribed by the University clinic, and were under observation and supervision of the clinic for some time after the disease had become inactive. Only cases which could definitely meet the diagnostic criteria of Jones[1] were included in the study. A large group of children with questionable diagnoses were eliminated. The criteria of Taran[2] were followed to establish that the disease had become inactive. In general, the criteria used for the diagnosis of the disease also were used for determining a recurrence. Because of the marked variability in manifestations and for comparative purposes, the recurrences were classified as major, minor, or possible recrudescences according to the description of Hansen.[3] Very vague joint pains of short duration without any other symptoms, signs, or laboratory findings were not included as recurrences.

The calendar years in which the onset of rheumatic fever occurred for these children ranged from 1930 to 1946. The median year of onset is 1941. For 90 per cent, onset of the disease occurred during the period from 1935 to 1944, inclusive. Of the 266 patients, 208 (78 per cent) were in the active

From the Department of Pediatrics, and State Services for Crippled Children, State University of Iowa.
Aided by a grant from the American Medical Association.

The second patient, an infant with tuberculous meningitis, was subjected to three such experiments in which two solution strengths, 1 and 5 per cent, were used subcutaneously and compared to an intravenous injection (Fig. 8).

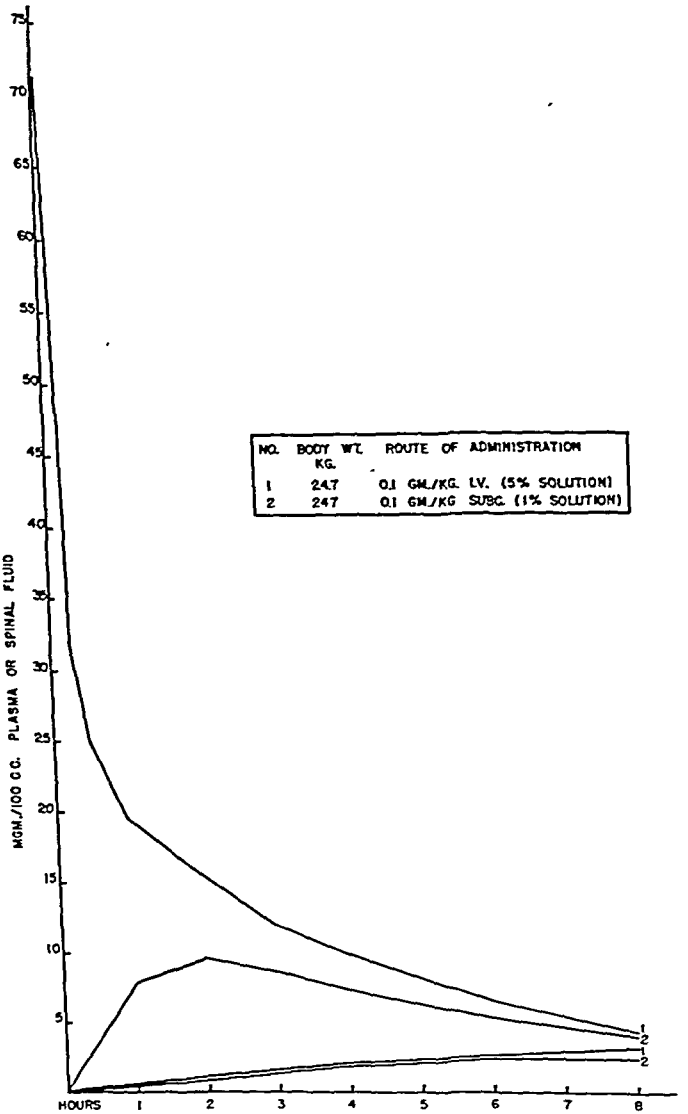


Fig. 7.—Plasma and spinal fluid concentrations of sulfadiazine following identical per kilogram single doses administered intravenously and subcutaneously to the same patient on different days.

The intravenous route produced slightly higher spinal fluid concentrations of sulfadiazine throughout the entire eight hours; however, the use of a 5 per cent solution subcutaneously appeared to possess no consistent advantage over the more commonly employed 1 per cent solution. These data and those of Fig.

there were any sign of infection, and to consult the family physician as early as possible. If another member of the family had a cold, sore throat, or any other infectious disease, the child was to be kept away from that person, and the family physician notified. The family was told to have the child play with other children in the normal way, but to plan his activities to avoid fatigue. In addition, psychologic advice was given to prevent overprotection. The importance of persevering with a high level of care day after day and year after year was emphasized and re-emphasized at each clinic visit.

A detailed medical report regarding the child's condition and home management was sent routinely to the family physician before the child returned to his home after hospital or sanatorial care and after each clinic examination. The family physicians were informed that the children were being observed partly for research purposes, and the doctors were encouraged to seek consultation if the children should have symptoms or signs suggestive of a recurrence. The State University of Iowa ambulance service made it possible to transport the children back to the University Hospital for observation or treatment when indicated.

About two-thirds of the children lived in areas where local public health or school nursing service was available. An individual public health nursing report regarding the child was sent to the local public health nurse or school nurse before the child returned to his home after institutional care and after each clinic visit. The local nurse was advised to make home visits as often as she felt it was necessary, and to instruct the family to consult the family physician if any further difficulty should arise. The local nurses routinely sent reports to the clinic regarding the home care of the children.

PROCEDURE

In analyzing the recurrence rates of rheumatic fever for this randomized study group, we recognize that there are multiple factors on which the prevalence of rheumatic fever is dependent, and that these must be taken into consideration in evaluating the rates. Among those we have endeavored to control in our analyses or describe for the group are: the age of the subjects; the susceptibility of the group; the cyclic variation in the prevalence of the disease; and the severity of manifestations.

In analyzing statistically the data of recurrences with environmental factors for the association, chi-square is computed and the per cent of recurrence for different environmental factors is tabulated.

FINDINGS

Rate and Type of Recurrences.—The 266 patients were under observation a total of 893.5 person-years, between the ages of 4 to 21 years. For the age group 4 to 13 years, there were forty recurrences for 504.5 person-years of observation, or a rate* of 7.9 per cent; for the age period 14 to 16 years, there were twenty-four recurrences for 233.5 person-years of observation, or a rate

*The recurrence rate for a specified age period is the number of recurrences during the specified period divided by the number of person-years observed during the specific period. The quotient is multiplied by 100 to express in terms of per cent.

in some respects more data should be at hand in order to permit such calculations; nevertheless, the general trend is clearly evident. Equilibrium has evidently been established by the time eight hours have elapsed, for the points fit in nicely with a straight line passing very close to the origin. The data for the two and four hour observations, however, are better represented by parabolic curves, indicating that sulfadiazine enters the spinal fluid somewhat more rapidly at high than at low plasma concentrations. A definite lag in the establishment of blood-spinal fluid equilibrium is evident, for the curves for the successive time observations incline more and more away from the y-axis. It is further evident that for a given attained plasma concentration the spinal fluid level is higher following intravenous administration. This latter point is brought out more clearly in Fig. 10, in which the spinal fluid concentrations, calculated from the equations given in Fig. 9*A* and 9*B*, are plotted for the three observation periods at three different arbitrary plasma levels. At the end of two hours, with an attained plasma concentration of 10 mg. per cent, intravenous administration results on the average in a spinal fluid concentration of 2.0 mg. per cent as against 1.0 mg. per cent for the subcutaneous route. Similarly, a dose of intravenously administered sodium sulfadiazine sufficient to produce a plasma concentration of 20 mg. per cent at two hours results in a spinal fluid concentration almost indentical with that produced by a plasma level of 30 mg. per cent after subcutaneous injection of the drug. The time lag for the subcutaneous as compared to the intravenous route appears to be about two hours. It should be emphasized that in all of these studies time was measured from the start of the injection and not from its completion, for in so doing, it was felt that the therapeutic implications of the study could be better evaluated from a clinical standpoint. Since the majority of the subcutaneous infusions required from thirty to sixty minutes for their completion, the advantages of the intravenous route would have been less apparent had we chosen the latter point from which to plot our data.

DISCUSSION

It is evidently possible in infants and children to establish rather quickly and to maintain blood concentrations of sulfadiazine of any desired magnitude in the therapeutic range by means of the subcutaneous administration of the sodium salt of the drug. The difference between children and adults in the ability of their subcutaneous tissues to absorb sodium sulfadiazine is difficult to explain. The reason cannot lie in greater solution volumes, for absorption was definitely more rapid in the children receiving doses similar to those given to adults (Fig. 4). In fact, the reverse would be expected because of the larger subcutaneous tissue volumes available in adults.

During the four-year period in which we have routinely employed the subcutaneous route for the parenteral administration of the various sulfonamide drugs, it has proved satisfactory for the vast majority of patients. Subcutaneous administration has given satisfactory blood levels in edematous patients, unless edema is very marked, and in those in peripheral circulatory collapse

pital-treated patients, chorea was the manifestation for six of the thirteen recurrences; for the patients receiving treatment elsewhere, chorea was the manifestation for fifteen of the forty-six recurrences. The difference in the recurrence rate for the treated and control groups of Iowa rheumatic patients is significant.

Table II compares specified recurrence rates of the study group with the rates as given by Wilson,[4] which reflect the expected rates of recurrence in a random sample of children with rheumatic fever:

TABLE II. RECURRENCE RATE OF RHEUMATIC FEVER OF SPECIFIED GROUPS

Within one year of previous attack	
4-16 years	
Iowa-control group, 134 patients	35.8 per cent
Wilson group	38.7 per cent
Iowa-treated group, 115 patients	12.0 per cent
Age specific	
4-13 years Iowa treated group	7.9 per cent
Wilson group	25.0 per cent
14-16 years Iowa-treated group	10.3 per cent
Wilson group	8.6 per cent
17-21 years Iowa-treated group	4.5 per cent
Wilson group	3.6 per cent

Of the ninety recurrences of the total group, forty-seven were major recurrences. This gives a rate for the major episodes for our group of patients observed between 4 to 21 years of 5.2 per cent.

Of the fifty-one children who experienced one or more recurrences under observation, three had carditis with no other manifestation, twelve had carditis in combination with other manifestations, two had polyarthritis and questionable carditis, seventeen had polyarthritis alone or in combination with some other manifestations but no carditis, five had chorea with some other manifestation but no carditis, and twelve had only chorea.

Of the fifteen children who had definite evidence of carditis, two were older children with pericardial effusion without evidence of myocardial or endocardial involvement. Of the remaining thirteen, eight had definite increase in heart involvement and increase in heart size (three of this group died), two had increase in heart involvement but no quantitative increase in heart size, one had an increase in heart size without progression of endocardial changes, one had endocardial changes but no residual increase in heart size, and one of the children has active rheumatic heart disease at the present time with increased involvement.

Of the three children who died, two had a severe recurrence within two months after leaving the sanatorium. One of these had marked cardiac damage from repeated attacks of the disease and died as a result of an acute infection with cardiac decompensation. No necropsy was made. The level of home care of this child was poor. The second of these three children was an 8-year-old girl who had developed severe myocarditis after measles (rubeola). She had no other manifestations of rheumatic fever and a diagnosis of toxic myocarditis had been made. Two months after leaving the sanatorium, the child became ill and was rehospitalized. She had definite evidence of myocarditis with decom-

to possess no advantage over the sodium salt.[8] We have preferred the subcutaneous to the intravenous route for parenteral sulfonamide therapy for the following reasons:

First, it is easier to administer solutions subcutaneously, particularly to small infants. Continuous or intermittent intravenous infusions are quite difficult to maintain over long periods, especially when many of the patient's available veins must be utilized for the purposes of parenteral feeding and other supportive measures. Using the subcutaneous route, it has been possible on many occasions to keep the sulfonamide concentration constantly at a level of 20 to 30 mg. per cent for as long as two weeks with a minimum of effort on the part of the resident house staff.

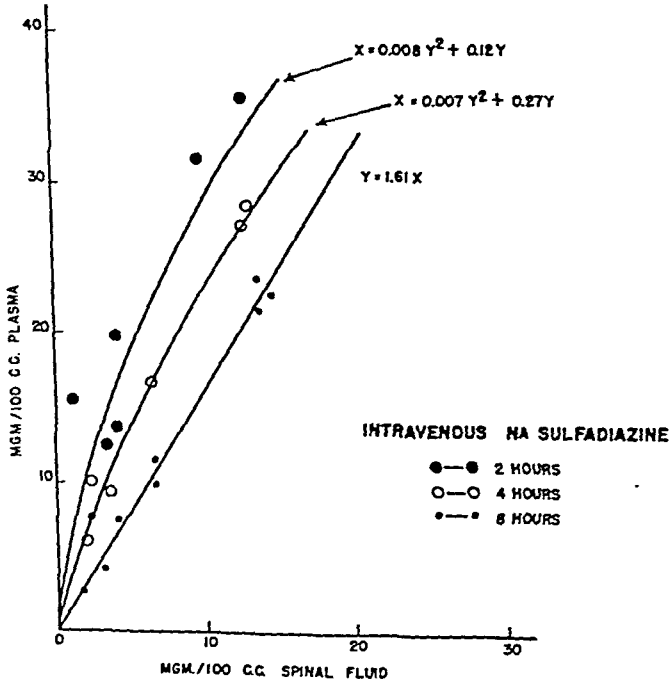


Fig. 9B.—(For legend, see opposite page.)

Second, an adequate amount of fluid and of alkali can be administered simultaneously with the sulfonamide drug. By using 0.5 per cent solutions, 200 c.c. of water are given with each gram of sulfonamide. Alkali in the form of 1/6 molar sodium lactate can easily be incorporated into the solution in sufficient quantities to render the urine alkaline. Thus three objectives are accomplished by one maneuver: chemotherapy, hydration, and alkalinization of the urine. If the intravenous route is used, the latter two of these objectives must be met by separate injections. It is for this reason that solution concentrations greater than 1 per cent possess no advantage in subcutaneous therapy.

AN EVALUATION OF THE RECURRENCES IN RELATION TO ENVIRONMENTAL FACTORS

The medical social worker appraised the economic and social situation of the home in which the patient lived after he came under care and supervision. The economic condition of the home was considered good when the income was sufficient to provide adequate diet, clothing, and shelter; fair when the income was marginal for diet, clothing, and shelter; poor when the income was not sufficient to provide adequate diet, clothing, and shelter. These ratings were available for 210 of the 266 patients.

Table III shows the number of children with recurrences and the number without recurrences for each of the three economic levels. Chi-square equal to .41 indicates no significant association between the distribution of the recurrences and the level of economic resources in the home.

TABLE III

HOME ECONOMIC SITUATION	RECURRENCE	NO RECURRENCE	TOTAL RHEUMATIC SUBJECTS
Good	9	37	46
Fair	19	65	84
Poor	21	59	80
Total	49	161	210

The social situation in the home was considered good if the parents were emotionally stable, sincere in their efforts, and cooperated well with the doctor; fair where the level of care was marginal, due to conditions which could not be controlled, and where cooperation was not always constant; and poor where the parents were either ignorant or indifferent, or both; where parental relationship was poor, where home life was disrupted, or where the parents could not help themselves, and no help could be obtained from the community. These ratings were available for 208 of the 266 homes.

TABLE IV

HOME SOCIAL SITUATION	RECURRENCE	NO RECURRENCE	TOTAL RHEUMATIC SUBJECTS
Good	3	27	30
Fair	18	65	83
Poor to fair	9	20	29
Poor	18	48	66
Total	48	160	208

Table IV shows the number of children with recurrences and the number without recurrences in the varying home social levels. Chi-square equal to 3.28 indicates an association between the distribution of the recurrences and the social situation, which is significant only at the 30 per cent level of confidence.

The third environmental factor rated for this rheumatic group is the dietary. The evaluation was made by one of the authors using the information obtained from histories taken at each clinic visit, from reports received from

subcutaneous therapy in clinical practice except under the most unusual circumstances. The use of larger per kilogram dosages for the initial stages of therapy, however, tends to overcome this discrepancy. When the two routes are compared in the same patient, there is little difference between them (Figs. 7 and 8), though average values obtained from a series of patients indicate that the intravenous route produces a given spinal fluid level approximately two hours in advance of the subcutaneous.

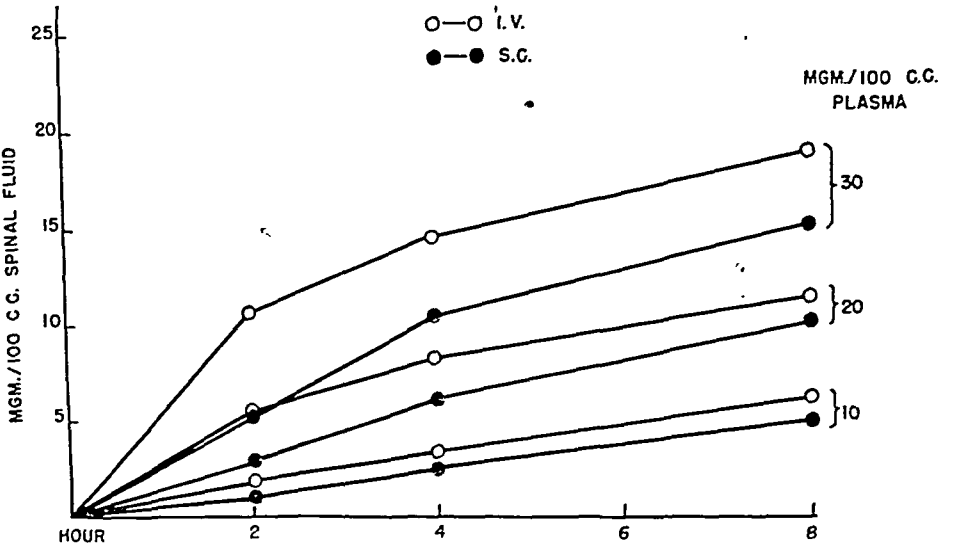


Fig. 10.—The spinal fluid concentration of sulfadiazine calculated from the data of Fig. 9 to occur for given attained plasma concentrations at various time intervals after the administration of sodium sulfadiazine intravenously and subcutaneously.

For the treatment of mild infections, the initial subcutaneous dose can be identical with that commonly employed for oral medication; namely, 0.1 Gm. per kilogram of body weight, with a maximum of 4 Gm. for the older children. When continued oral therapy is impracticable, we have found doses of 0.1 Gm. per kilogram repeated at eight to twelve-hour intervals sufficient to keep the blood level in the neighborhood of 10 mg. per cent. In those children with unusually severe infections, for whom blood levels of 20 to 30 mg. per cent are desirable, an initial dose of 0.3 Gm. per kilogram (maximum 8 to 10 Gm.) should be employed. From a large clinical experience, of which Fig. 2 is an example, we have found that sustained doses of from 0.3 to 0.6 Gm. per kilogram per twenty-four hours, given in divided doses at eight-hour intervals, are essential to the continuance of such levels. With such intensive therapy, however, because of possible variations in the attained blood levels, blood sulfadiazine analyses should be performed daily and dosage individualized. It is rather clear that oral administration fails to approach this goal in infants and children, although levels as high as 50 mg. per cent have been reported in adults.[7] Reinhold and his associates have noted that microcrystalline preparations of sulfadiazine are absorbed somewhat more rapidly by adults than is

Table VI shows the presence of recurrences in different environmental groups.

The thirteen children who had recurrences with carditis comprise a group that suffered the serious effects of the disease. An analysis of their histories and environmental care shows that three of these children died within two months of their discharge from the sanatorium, and, in retrospect, there is doubt as to whether or not their disease was inactive. Their environmental care was fair or better, except for one boy who lived in a poor social situation. The ten children who survived with carditis, on the whole, lived in a poor home environment; all lived in poor social situations, seven in very limited economic circumstances, seven on a poor dietary, and three on a fair dietary.

Table VII shows the type of diet and level of home care received by the three children who died and by the ten children who had recurrences with carditis.

TABLE VII

LEVEL	HOME SITUATION		DIETARY
	ECONOMIC	SOCIAL	
	Three Children Who Died		
Good	1	0	2
Fair	2	2	1
Poor	0	1	0
	Ten Children With Carditis		
Good	1	0	0
Fair	2	0	3
Poor to Fair	0	3	3
Poor	7	7	4

DISCUSSION

An unexpectedly low recurrence rate is found for a highly susceptible group of young rheumatic children who have received special attention to improve their diets and level of home care. The management was more effective in lowering the recurrence rates in the younger children whose habits of living can be changed with less difficulty than the children approximately 14 years or more. The chances are greater also that younger children with the disease are living in a time in the family's existence when the burdens to be borne by the family are heaviest and consequently the needs of the child are met with greatest difficulty by many families.

Although the economic situation of the home for the study group showed no direct association with the distribution of the recurrences, our experience was that whenever poverty was present it was exceedingly difficult to provide the essentials of care, particularly an adequate diet. With outside help and supervision 33 per cent of the children in the poor economic group received a good diet and 36 per cent a fair diet.

Of the environmental factors rated, the most significant association is seen between the level of dietary care and the rheumatic recurrences. All ten of the children who had recurrences with carditis were receiving inadequate diets and living in poor social situations. It is known that the absence of good nutrition may induce a decreased resistance to bacterial infection. It seems a rea-

3. Forbes, G. B., Perley, A. M., and Dehlinger, J.: J. PEDIAT. 28: 24, 1946.
4. Bratton, A. C., and Marshall, E. K., Jr.: J. Biol. Chem. 128: 537, 1939.
5. Plummer, N.: New York State J. Med. 43: 425, 1943.
6. Reinhold, J. G., Phillips, F. J., and Flippin, H. F.: Am. J. M. Sc. 210: 141, 1945.
7. Jorgensen, G. M., and Greeley, D. M.: J PEDIAT. 21: 325, 1942.
8. Nelson, C. T., and Spink, W. W.: Am. J. M. Sc. 206: 315, 1943.
9. Clarke, G. H.: Am. J. Dis. Child. 73: 565, 1947.

ADDENDUM

Since this paper was submitted for publication, an article has appeared by Clarke[9] in which a comparison is made between the oral and parenteral routes of sulfonamide administration in children.

group. The incidence of recurrences and of carditis for this group was as high as it was for any age period of our study group. All the adolescent children with carditis had poor diets and lived in poor home social conditions. For the 95.0 person-years observed from 18 to 21 years, there was no recurrence with carditis. The young adults with rheumatic fever in the armed services would fall into this older group. It is important to remember that carditis is more common during childhood and adolescence, when nutritional requirements are high. When the heights and weights of the rheumatic patients are plotted on growth charts, it has been noted that many fall in the out groups of body build, as undersized, obese, or tall-thin. We plan to study the growth charts further to see if these deviations have any significance in the light of the patients' dietary and history of disease.

The evidence presented in the literature is both for and against the existence of a definite correlation between nutrition and rheumatic susceptibility. The same is true concerning environmental care. Taran[6] found the incidence of recurrence of rheumatic fever after convalescent care to be four times as high in children who return to poor home environment as in those who return to good living conditions at home. Coburn and Moore[7] analyzed statistically data on the dietary of less susceptible and more susceptible rheumatic subjects. They found a close association between nutrition in childhood and rheumatic susceptibility. A preliminary report by the same authors on the results of reenforcing the diets of a small group of rheumatic children with eggs shows none of the subjects experienced a recurrence. These results were published pending further research. At the present time we are accumulating more detailed nutritional histories and biochemical studies on all new rheumatic subjects in order to correlate the nutritional state of the patients with the clinical manifestations of the disease.

We have classified the recurrences of our subjects as major, minor, and possible, in order to compare them with the reported rates in the literature. A more desirable classification might be to separate the recurrences into two groups; one, those patients having a recurrence with clinical evidence of carditis, and two, those patients having a recurrence without clinical evidence of carditis. In other words, segregate into one group the patients with proliferative signs as compared with those in the second group with only exudative manifestations.

The recurrence rate for major episodes for the accumulated reported groups of rheumatic patients who have received sulfonamide prophylaxis is 1.5 per cent. The recurrence rate for major episodes for our group of patients between 4 to 21 years is 5.2 per cent. However, these two groups of patients are not comparable, since the accumulated reported group of rheumatic patients who received sulfonamide prophylaxis included more patients of the older age group and chorea was excluded in some of the sulfonamide prophylactic groups. Chorea was a type of manifestation we found most difficult to prevent, and accounts for approximately one-sixth of the recurrences. The well-controlled groups reported by Kuttner,[8] however, are of children and the result of the treated as compared with the control group showed beyond doubt,

phase of their disease when they were first placed under our care; in 9 per cent the disease had been inactive less than six months; in 4 per cent the disease had been inactive six months to one year; in 2 per cent the disease had been inactive one year to two years; and in 6 per cent the disease had been inactive more than two years. For two patients the disease had been inactive when they were first observed but how long it had been inactive was indefinite.

Sixty-one per cent of the children came under observation having had one attack or during the first attack; 25 per cent having had two attacks or during the second attack; and 14 per cent having had more than two attacks.

The median number of years of observation is 3.3; 27.4 per cent were observed five or more years and 23 per cent were observed less than two years. One hundred ninety-five (73 per cent) were under close medical supervision, that is, they made regular visits to our clinic. Seventy-one (27 per cent) were under indirect supervision, that is, they made an occasional visit to the clinic, and were followed by their local physicians and a public health nurse, who reported the condition of the children to us.

MANAGEMENT

As soon as a child with rheumatic fever comes under the supervision of the University Hospital or the mobile clinics of the State Services for Crippled Children, an investigation of the child's home environment is made by a trained medical social worker, and every effort is made to insure the child a good level of environmental care. If the child has active rheumatic fever, he is hospitalized or given sanatorial care, unless a high level of home care can be provided or the family refuses to accept institutional care. About half the children of the study group were hospitalized in the University Hospital. About a third received sanatorial care in the sanatorium connected with the Hospital. The remaining children were cared for in their own homes or in local hospitals during the acute phase of the disease.

The family of each child was instructed by the doctor and nurse and often by a dietitian regarding the importance of an adequate diet which should include the daily consumption of: one quart of milk; one or two eggs; one serving of meat, fish, chicken, or liver; two vegetables (½ cup is considered a medium serving); one orange, apple, or tomato; one other fruit in addition; one teaspoonful of cod liver oil; six teaspoonfuls of butter or margarine. They were also told that other foods such as bread, cereal, and potatoes could be added to satisfy the appetite and maintain correct weight, but under no circumstances were they to replace any of the above; cereal was not to be served more than once daily. Rather, the child was to be encouraged to eat larger quantities of fruits and vegetables; varieties of these were to be used so the child would not form likes and dislikes.

Each family was advised to have the child sleep in a room of his own whenever possible or at least to sleep alone, and to have about ten hours of rest each night. The importance of proper clothing was stressed, as well as control of temperature and humidity of the home. With regard to the care of intercurrent infection, the family was advised to have the child go to bed if

the study group was lower for the age group 4 to 13 years and slightly higher or the same for the older age groups. It is noteworthy that the age from 4 to 13 years is a period in which nutritional requirements of the child are high and a time in the child's life when his habits of living can be controlled with less difficulty than from approximately age 14 years and older. The most significant association between the environmental factors and the distribution of the recurrences was found for the dietary factor. These data do not indicate with a high degree of confidence that there is an association between the distribution of the recurrences and the home social situation. However, the extreme social situation groups show significant differences in the per cent of recurrences favoring better social environment, and all children who had recurrences with carditis lived in poor social situations. The distribution of the recurrences did not show any association with the family's economic level. The dietary ratings of the group are related to the economic levels, but even in the poor economic level, more received good or fair diets (33 per cent and 26 per cent) than would have been expected without outside supervision and help.

Every precaution must be taken to be certain the disease is inactive before liberating the child and depending on a high level of environmental care to protect the child from further attacks. The major recurrence rate, although low, was higher than the rate for patients treated with sulfonamide prophylaxis. It was concluded that if the disease is definitely inactive, an excellent diet and wholesome living conditions will practically eliminate the chances of a recurrence with carditis; and that sulfonamide prophylaxis is indicated for children recovered from rheumatic fever who have had definite carditis and are forced to live in an environment which does not provide a good diet and at least a fair level of general care.

REFERENCES

1. Jones, T. D.: J. A. M. A. 126: 481, 1944.
2. Taran, L. M.: J. PEDIAT. 29: 77, 1946.
3. Hansen, A. E.: J. PEDIAT. 28: 296, 1946.
4. Wilson, M. G., and Lubschez, R.: J. A. M. A. 126: 477, 1944.
5. Jones, T. D., and Bland, E. F.: J. A. M. A. 105: 571, 1935.
6. Taran, L. M.: J. PEDIAT. 18: 737, 1941.
7. Coburn, A. F., and Moore, L. V.: Am. J. Dis. Child. 65: 744, 1943.
8. Kuttner, A. G., and Reversbach, G.: J. Clin. Investigation 22: 77, 1943.
9. Stowell, D. D., and Button, W. H.: J. A. M. A. 117: 2164, 1941.
10. Baldwin, J. S.: J. PEDIAT. 30: 67, 1947.
11. Epidemiology Unit No. 22: J. A. M. A. 129: 921, 1945.
12. Damrosch, D. S.: J. A. M. A. 130: 124, 1946.
13. Baldwin, J. S.: J. PEDIAT. 30: 288, 1947.

of 10.3; for the age period 17 to 21 years, there were seven recurrences for 155.5 person-years, or a rate of 4.5 per cent.

For the total group, seventy-one major and minor recurrences were experienced by fifty-one children. Table I shows the age-specific recurrence rates of rheumatic fever for children under our observation.

TABLE I. AGE SPECIFIC RECURRENCE RATES FOR 266 RHEUMATIC INDIVIDUALS COMPRISING 893.5 PERSON-YEARS OF OBSERVATION

AGE (YRS.)	PERSON-YEARS	RECURRENCE*	RECURRENCE WITH DEATH	RATE OF RECURRENCE (PER CENT)
4	6			0.0
5	16	1		6.2
6	30.5			0.0
7	44.5	1		2.2
8	56	5	1	10.7
9	61.5	2	1	4.9
10	64.5	5		7.8
11	73.5	10	1	15.0
12	75	8		10.7
13	77	5		6.5
4 to 13	504.5	37	3	7.9
14	82	5		6.1
15	80	9		11.2
16	71.5	10		14.0
14 to 16	233.5	24		10.3
4 to 16	738.0	61	3	8.7
17	60.5	4		6.6
18	48.5	1		2.1
19	32.5	2		6.1
20	12			0.0
21	2			0.0
17 to 21	155.5	7		4.5
4 to 21	893.5	68	3	7.9

*Major and minor episodes included; possible episodes not included.

The recurrence rate of Iowa-treated groups shows a significant deviation from the natural course of the disease. This difference is evidenced during childhood and is not present for the groups 14 years and older. Chart 1 compares the age specific recurrence rates of the Iowa study group of rheumatic subjects with rates derived by Wilson for a random sample of rheumatic subjects. There is a marked difference in the compared groups for the age period 4 to 13 years. From 14 to 21 years, the difference is not significant.

With few exceptions, the histories from the time of onset of rheumatic fever for each patient in the group are recorded. From the available histories, a study was made of the recurrence rate of two comparable groups, except for treatment, for the first year after onset. Both groups were from the same geographic area, belonged to the age group of 4 to 16 years, and had had a recent onset of the disease. In the group that received hospital treatment, there were 115 children under observation 108.5 person-years. In the group that was not treated by the hospital, there were 134 children with histories covering 128.5 person-years. The number of recrudescences (major, minor, and possible) for the groups, respectively, is 13 and 46, and the rate of recurrence for each group, respectively, is 12.0 and 35.8 per cent. For the hos-

Hemihypertrophy has been described as early as a ten mm. embryo and has been demonstrated quite frequently at birth.[7] Detection in infancy depends on the sensitization of the observer to the existence of such an entity. In many of the cases both halves of the body grow paripassu until puberty, at which time the malformation may become accentuated.[9] Males are more commonly affected than females.[5, 7, 13] Its apparent rarity in the Negro is probably weighted by the fact that most of the reports come from institutions with a low Negro population. On the other hand, Halperin[3] states that anatomic studies reveal the incidence of asymmetry to be lower in the Negro than the white race.

CLASSIFICATION

The literature is confusing in its designations and definitions when referring to the subject of total hemihypertrophy. The entity has been designated by various authors under the following names: "true total hemihypertrophy,"[9] "unilateral hypertrophy,"[13] "congenital hypertrophy,"[14] "hemigigantism,"[15] "hemihypertrophy totalis,"[16] "hemimacrosomia,"[20] and "partial gigantism."[19] Statistical evaluation of the cases reported is almost impossible because of the incompleteness of protocols and the lack of a uniform descriptive terminology.

Stoesser[20] first attempted to clarify the situation by proposing the following classification:

I. True hypertrophy
  A. Congenital hypertrophy
    1. Partial hypertrophy
      (a) Hemihypertrophy
      (b) Crossed type of hypertrophy
    2. Total hemihypertrophy
  B. Acquired hypertrophy

II. False hypertrophy
  A. Congenital hypertrophy
    1. Milroy's disease
    2. Elephantiasis
    3. Hemihypertrophy
  B. Acquired (elephantiasis)

This classification would be acceptable, except that it does not provide for inclusion of those cases in which the hypertrophy is not total but is limited to one or several systems. We should like to suggest a more complete classification.

HYPERTROPHY

Congenital

I. Total hypertrophy (involving all systems)
  A. Segmental
  B. Crossed
  C. Hemihypertrophy

pensation and died within a few days. A post-mortem examination revealed definite, active, rheumatic heart disease. The other child who died was under observation for over two years, and there was some difference of opinion as to whether the patient's disease was inactive. The child was less than 6 years of age when first seen at the clinic with his second attack of rheumatic fever. His disease remained active for about one year and at the end of this period of observation there were no signs of activity except the erythrocyte sedimentation rate readings had decreased only to within high normal range. On each subsequent out-patient examination, the erythrocyte sedimentation rate readings were slightly elevated but there were no other symptoms or signs of activity. The fatal recurrence occurred at home and no post-mortem examination was made.

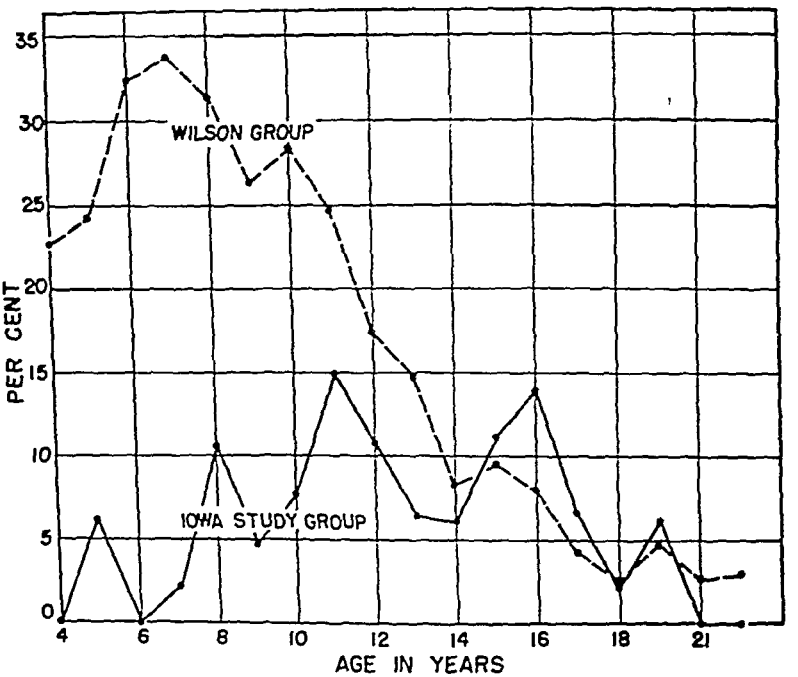


Chart 1.—Comparing the age specific recurrence rates of the Iowa study group of rheumatic subjects with the rates derived by Wilson for a random sample of rheumatic subjects. There is a marked difference in the compared groups for the age period 4 to 13 years. From 14 to 21 years, the difference is not significant.

Seventeen children experienced twenty-three recurrences in which chorea was the only manifestation. It was thought that a selective factor might very possibly bring an unusual number of choreic patients under our care and unduly weight our sample with this type of patient. A check of the number of patients having chorea at time of first observation showed that sixty-seven of 266 or 25.2 per cent had chorea at time of first visit. Jones and Bland[2] analyzed 1,000 consecutive cases of juvenile rheumatism at the House of the Good Samaritan in Boston and found that 28 per cent of all their cases had "pure chorea." It was concluded that this sample had a representative number of choreic patients.

as the cause of hemihypertrophy.[4, 9, 22] It is known that arteriovenous aneurysms can cause true hypertrophy. In cases of congenital total hemihypertrophy, vascular lesions such as nevi and telangiectasis often occur on the contralateral side.[4, 9] Disturbance of the lymphatic system[4, 9, 23] have been suggested as the cause of this hypertrophy because of its superficial resemblance to elephantiasis and idiopathic lymphedema (Milroy's disease).

Lesions of the central nervous system are known to cause hemiatrophy, which is often confused with hemihypertrophy.[2] Cases of total hemihypertrophy which have come to autopsy failed to reveal any central nervous system involvement.[3] Mechanical influences (such as pressure on the developing ovum or fetus) have been shown experimentally to influence growth. In these instances hemiatrophy is expected rather than hypertrophy.

The relationship of skeletal overgrowth in association with neurofibromatosis has been reported.[12, 17] A definite segmental overgrowth in relation to the affected nerve was pointed out, suggesting that the presence of the abnormal nerve structure resulted in overstimulation and consequent overgrowth of the extremity. The overgrowth was mixed (over- and underdevelopment), representing lack of control rather than stimulation of growth. Although this theory is fascinating, none of the autopsied cases in the literature of congenital total hemihypertrophy have revealed evidence of neurofibromatosis.[3] Schwartzman and Grossman[9] by the use of atropine, adrenalin, and pilocarpine, were unable to detect any changes in the vegetative nervous system of the hypertrophied side as compared to the normal.

Gesell[4, 5] feels that an imbalance of the normal process of twinning is involved in hemihypertrophy. The idea is advanced that it represents a physiologic isolation of equivalent parts of the blastoderm. One side of the two bilateral primordia is thought to be subjected to an inequality so that at first physiologic independence and later actual physical change is manifested.

Heredity has received little note as an etiologic factor. Scott[13] reports the occurrence of hemihypertrophy in a mother and daughter, and Reed[28] reported its appearance in a brother and sister.

The whole gamut of abnormalities is obviously possible. The numerous developmental anomalies which are often seen in association with hemihypertrophy probably represent related facets of this entity.

FINDINGS

Mental deficiency is often the presenting complaint. This is said to occur in from 15 to 20 per cent of cases.[7, 9] Physical and mental measurements usually show that the condition once developed remains relatively constant. The gross asymmetry is usually obvious. The hypertrophied parts appear to be edematous although the skin may feel normal in texture. In some instances it has been described as being thickened. The range of hypertrophy may vary from the simple overgrowth of a digit to complete hypertrophy of one-half or more of the body.[5] It may involve an extremity, half of the skull, or half of the thorax. The asymmetry of the skull resembles that seen in hydrocephalus. The hair on the enlarged side is thickened. The pupil on the involved side is frequently

the mothers, public health nurses, and social workers. The patients were classified into groups according to the way they followed the prescribed diet.

Good: Dietary advice adhered to at all times.

Fair: Dietary advice followed most of time; common errors were

(a) supplementary Vitamin D frequently omitted;
(b) child eating excessive amounts of unessential foods;
(c) limited selection of vegetables or fruits.

Fair to good: Fluctuations from fair to good.

Poor: Diet definitely low in one or more essential foods; the diets were most commonly low in protein, minerals, Vitamin D and the Vitamin B group.

Poor to fair: Fluctuating from poor to fair.

Very poor: Diet very inadequate; one or more essential foods absent.

These ratings were available for 251 of the 266 subjects. Table V shows the number of rheumatic children with recurrences and the number without recurrences in the various dietary levels. Chi-square equal to 18.45 indicates an association between the distribution of the recurrences and the dietary ratings which is significant with a high degree of confidence.

TABLE V

DIETARY	RECURRENCE	NO RECURRENCE	TOTAL RHEUMATIC SUBJECTS
Good	7	77	84
Fair to good	6	33	39
Fair	18	71	89
Poor to fair	10	11	21
Poor and very poor	7	11	18
	48	203	251

TABLE VI

ENVIRONMENTAL GROUP	RECURRENCES	
	NUMBER	PER CENT
Poor dietary	17 of 39	43.6
Poor home social	27 of 95	28.3
Poor home economic	21 of 80	26.2
Poor dietary and poor home social	14 of 29	48.2
Poor dietary and poor home economic	10 of 22	45.4
Poor home social and economic	18 of 69	26.1
Poor dietary, poor home social and economic	10 of 21	47.6
Fair dietary	18 of 89	20.2
Fair home social	18 of 83	21.7
Fair home economic	19 of 84	22.6
Fair dietary and fair home social	9 of 39	23.1
Fair dietary and fair home economic	8 of 34	23.5
Fair home social and economic	12 of 61	19.6
Fair dietary, fair home social and economic	8 of 32	25.0
Good dietary	13 of 123	10.5
Good home social	3 of 30	10.0
Good home economic	9 of 46	21.9
Good dietary and good home social	1 of 23	4.2
Good dietary and good home economic	5 of 31	16.1
Good home social and economic	3 of 28	10.9
Good dietary, good home social and economic	1 of 21	4.8

Measurements during life:

Height	68 cm.
Circumference of the head	47 cm.

	Right (cm.)	Left (c.m.)
Length of arm	17.0	16.0
Length of forearm	8.5	8.5
Length of leg (knee to ankle)	12.5	12.0
Circumference of forearm	14.5	12.75
Circumference of thigh	20.0	18.0
Circumference of calf	17.0	15.5



Fig. 1.—The right half of the skull is larger than the left.

Roentgenograms.—(Immediately after expiration.) There was moderate enlargement of the right half of the skull. The suture lines were normal and there was no evidence of increased intracranial pressure (Fig. 1). The chest (Fig. 2) showed nothing unusual except that the layers of the soft-tissue shadows on the right side of the body appeared to be wider than those on the left. This was also evident in the abdomen (Fig. 2). The upper (Fig. 3) and lower extremities (Fig. 4) demonstrated the marked increase in the size of the soft-tissue shadows on the right.

Measurements: (length)	*Right* (cm.)	*Left* (cm.)
Humerus	8.0	7.3
Ulna	7.2	7.1
Radius	6.7	6.3
Femur	11.3	11.1
Tibia	8.6	8.5

sonable hypothesis that improper nutrition may be one of the major factors which allows the host to respond abnormally to an infection. In our dietary data, the essentials most commonly deficient were protein, vitamin D, thiamine, and minerals. The dietary information was insufficient to allow quantitative computation, but the majority of the children were receiving inadequate diets at the time they developed their attack of rheumatic fever which brought them under our observation (Chart 2). The degree of deficiency of the diet appears to be related to the incidence and degree of heart damage.

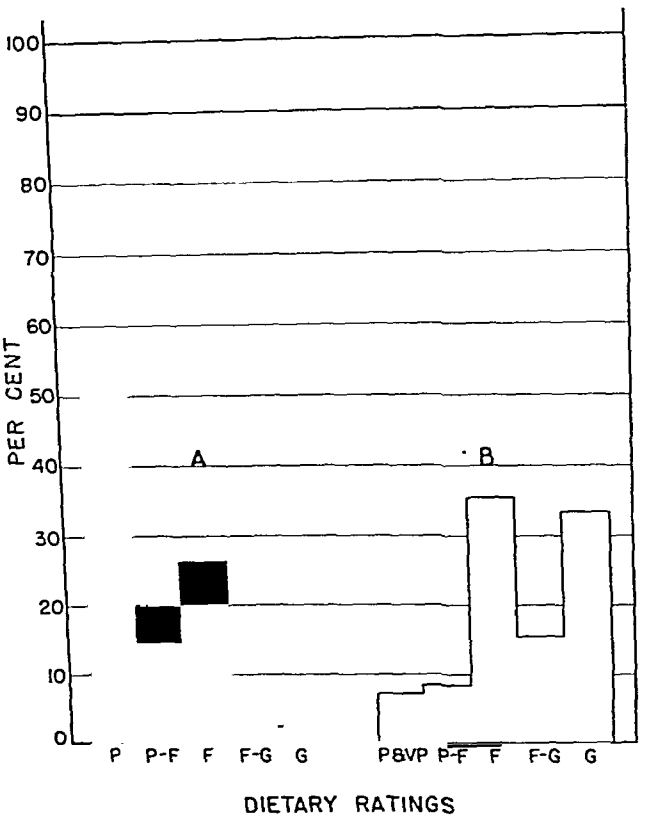


Chart 2.—The distribution of the dietary ratings of the rheumatic subjects (*A*) before observation and dietary instruction and (*B*) during observation and after dietary instruction. The area of each histogram to the left shows the proportion receiving the poorer dietary and to the right the better dietary.

It has been reported that the recurrence rate of rheumatic fever for a random sample is lower after puberty than before. The recurrence rate of our group after puberty was not significantly different from that reported for a random sample. The boys and girls who comprised the group (14 to 18 years) were those from whom little cooperation could be obtained because of the many instances of poor home social situations. The habits of living of these children were well established and they had the expected adolescent revolt against a supervised program. Our therapy probably was not given a chance to change the general situation or the course of the disease for many of the

Body Cavities.—The peritoneal cavity contained no free fluid and the viscera were in normal position. Approximately 50 c.c. of clear fluid were found in the left pleural cavity, but no excess of fluid was present on the right side. The pericardial sac contained an estimated five c.c. of clear fluid.

The ribs appeared to be normal. There was slight anterior bowing of the thoracic spine between the levels of the fifth and twelfth vertebral bodies. The lumbar vertebrae showed no abnormality.



Fig. 3.—Roentgenograms showing a marked increase in the soft-tissue shadows of the right upper extremity as compared to the left. This is most marked in the region of the subcutaneous fat.

Thymus.—The position was normal, and the thymic tissue was estimated to weigh about 5. gm.

Thyroid Gland.—Apparently normal.

Heart.—The position and shape were normal. Weight was not recorded. The circumferences of the valves were: pulmonary, 2.5 cm.; tricuspid, 3.5 cm.; aortic, 2.0 cm.; and mitral, 3.0 cm. The right ventricular wall measured .02 cm. and the left ventricular wall 0.8 cm. in maximal thickness. The endocardial surfaces and the valves appeared normal The myocardium was pale but not otherwise remarkable.

Lungs.—The right lung weighed 65 Gm. and appeared to be entirely normal. The interlobar fissures were well formed. The left lung weighed fifty Gm. and appeared to be normal, with the exception of a few small hemorrhages on the pleural surface.

Spleen.—The capsular surface was smooth and dark purple-red. The weight was 25 Gm. On sectional surfaces the pulp was dark raspberry-red.

Pancreas.—The over-all length was 8 cm. and the greatest diameter was about 1 cm. On section, the lobular structure appeared to be entirely normal.

Liver and Gall Bladder.—Total weight was 275 Gm. The capsular surface was dull and the parenchyma tended to bulge slightly at the margins of the incised capsule. Sec-

the prophylactic value of the drug. The rate is about one per cent for the sulfonamide prophylactic group. This author reports that the per cent of toxic reactions observed was fairly high, about 10 to 12 per cent. Stowell and Button[9] have reported the death of one child from agranulocytosis. Although toxic reactions from the use of small doses of sulfanilamide have been few and the reduction of rheumatic fever recurrences remarkable, nevertheless, sulfanilamide is by no means a harmless drug.

In addition to the toxic reactions from chemotherapeutic or antibiotic agents, there is also the danger that the host may lose his immunity to resist the organism and also the bacteria may become resistant to the drugs. Baldwin[10] has reported on the follow-up of a small group of children who had received chemoprophylaxis. She found no evidence of increased susceptibility to streptococcal infection and rheumatic activity at the time sulfanilamide was withdrawn. Epidemiology Units Numbers 22 and 89 of the Navy[11] and Damrosch[12] report the appearance of resistant strains of beta hemolytic streptococci after the use of sulfadiazine prophylaxis. Baldwin[13] also has reported that she did not observe the appearance of any sulfonamide resistant strains of streptococci in a group of rheumatic children treated prophylactically with sulfadiazine.

It is feared, since sulfonamide drugs have been found to offer a simple means of preventing recurrences of rheumatic fever, that more indifference to the problems of environmental care will follow. This study indicates that every effort should be made to tackle the problem of improving the general living conditions of these children. It requires much more time, knowledge, and patience to instruct the mother how to care for and feed her child than to instruct her how to give a few pills each day. It is usually easier for the social worker to obtain medication for an indigent child than to arrange for a satisfactory level of home care including an adequate diet.

Families who have been helped to provide a high level of environmental care for their children should have fewer siblings develop the disease. The next generation of children also should have a lower incidence of rheumatic fever. Studies of groups of rheumatic patients should evaluate not only the recurrence rate of the group but also the social adjustment of the children. Children given opportunity for more wholesome relationships, better diet, and outside attention make remarkable physical, emotional, and intellectual growth.

Some rheumatic children will come under observation who are forced to live in unfavorable environments, and these children should definitely be given the benefit of sulfonamide prophylaxis, particularly those of this group with definite valvular heart disease and cardiac enlargement should be given this added protection.

SUMMARY AND CONCLUSION

The recurrence rate of rheumatic fever in this study group of rheumatic subjects who received special attention to improve their diets and level of environmental care is significantly different from that reported by Wilson for a random sample and from a comparable Iowa group that did not receive improved environmental care the first year after onset. The recurrence rate for

After fixation, the brain weighed 1,375 Gm. Clotted blood filled the lumens of both posterior cerebral arteries. In multiple frontal sections the brain substance appeared to be edematous and was softer than normal. The lateral ventricles were moderately dilated. Numerous red points resembling perivascular hemorrhages were found in the region of the basal ganglia on both sides and in the brain stem at the level of the superior colliculi. One small focus of discoloration in the left occipital lobe resembled an abscess.

MICROSCOPIC FINDINGS

Brain.—(Including cerebral cortex, midbrain, pons, and medulla.) The principal pathologic alteration consisted of diffuse proliferation of the reticulum cells of the arachnoid. There was also infiltration of its interstices with large mononuclear cells (many of a macrophagic type), small mononuclear cells including lymphocytes and plasma cells, and a relatively large number of polymorphonuclear neutrophiles. In a few places there was evidence of beginning organization of the exudate in the form of dense masses of fibroblast-like cells. In the region of the basilar artery, dense zones of small lymphocytes partly surrounded the vascular spaces. The only alteration of the brain substances was slight perivascular edema which was most pronounced in the cortical gray substance. No abscess formation was found in the sections examined.

Heart.—The myocardium showed no significant alterations. The endocardium and pericardium were thin and smooth.

Lungs.—Slight intralveolar edema.

Thymus.—Differentiation between cortex and medulla was lacking. Lymphoid cells were relatively scanty and were diffusely but irregularly scattered throughout the glandular substance. Hassell's corpuscles were apparently normal. The capsule and trabeculae appeared edematous.

Thyroid.—Not remarkable.

Spleen.—Essentially normal.

Pancreas.—Apparently normal.

Liver.—Advanced parenchymatous degeneration and necrobiosis of the parenchyma in the central zones with slight leucocytic infiltration.

Adrenals:—The cortical zones were well demarcated. The cortex appeared thinner than normal (averaging approximately ½ mm.) but was otherwise not remarkable.

Kidneys.—Mild diffuse parenchymatous degeneration and focal advanced degeneration of a few tubules apparently of the distal convoluted portion. Occasionally a small focus of fibrinoid degeneration of the glomerular tufts was seen.

Skin.—The vessels were more prominent in the subcutaneous tissue on the right. The prominence was due to medial hyperplasia of all the vessels, especially of the arterioles.

PATHOLOGIC DIAGNOSIS AND SUMMARY

1. Unilateral hypertrophy of the somatic tissues of the body, including the right side of the skull, right cerebral hemisphere, right side of the body wall, and right upper and lower extremities.
2. Diffuse purulent leptomeningitis (nonhemolytic streptococci).
3. Acute parenchymatous degeneration of the liver and kidneys.
4. Thrombosis of both posterior cerebral arteries.

The *chief diagnosis* was acute purulent leptomeningitis.

DISCUSSION

The only condition which might be mistaken for hemihypertrophy is the one of hemiatrophy due to brain injury. In the latter, neurologic disturbances due to degenerative changes are demonstrable, whereas the former is associated with developmental anomalies.

A REVIEW OF THE SUBJECT OF CONGENITAL HEMIHYPERTROPHY AND A COMPLETE CASE REPORT

JOHN WARD, M.D. AND HENRY H. LERNER, M.D.
SALT LAKE CITY, UTAH

HEMIHYPERTROPHY is defined as hypertrophy or overgrowth of one-half or one side of the body.[1] Total hemihypertrophy specifically indicates that the overgrowth includes all of the systems: muscular, vascular, neurologic and skeletal. This entity should be differentiated from hemiatrophy, wherein there is comparative smallness of one half of the body due to a lesion of the post-central gyrus.[2]

Anatomic observations in both the living and the cadaver have established the fact that symmetry of the two halves of the body does not exist (Halperin, quoting Meckel).[3] This was recognized by the sculptors of Greece and Rome, whose statues, being modeled after living subjects, showed such awareness long prior to the descriptions of anatomists. Moderate asymmetry is so common that it is not considered significant. The only reports to reach the literature are those in which this finding is unusually prominent.

LITERATURE

Interest in hemihypertrophy was first stimulated in 1822 by the anatomic studies of Meckel pointing out the variations in size and shape of the right and left halves of the body.[3] In 1839 the first clinical study of a patient with hemihypertrophy was reported by Wagner[9] and was soon followed by the reports of Desvouges and associates.[7] Liebriech,[3] in 1908, pointed out that asymmetry of the face and skull is the characteristic finding in the human species. In 1921 and 1927 Gesell[4, 5] reviewed the literature and discussed fully the current theories as to the etiology of hemihypertrophy. Lenstrup,[6] in 1926, and Wakefield and Hines,[7] in 1933, re-evaluated all of the reported cases. By 1939, Petre[5] noted that there were 103 cases in the world literature. In 1942, Schwartzman and Grossman,[9] after critically analyzing Petre's paper, stated that only 101 of these cases fitted the true total hemihypertrophy category. They added one case of their own. Since then, additional cases have been reported by E. Toussaint Aragon,[10] Sayer and Fatherree,[14] and Rugel[11] bringing the total to 105. We are reporting the one hundred and sixth case. In the literature there are only seven cases mentioned as including a complete necropsy protocol.[11, 18, 21, 27, 31-33] This will make the eighth.

INCIDENCE

Actual statistics as to the incidence of mild forms of asymmetry have not been given much prominence, in view of the fact that it is evident to some degree in all individuals. Marked asymmetry is probably much more common than a review of the literature would indicate.

From the Department of Radiology, University of Utah School of Medicine.

20. Stoesser, A. V.: Hypertrophies of Infancy and Childhood, Am. J. Dis. Child. 35: 885, 1928.
21. Hutchison, R.: Hemihypertrophy, Proc. Roy. Soc. Med., Lond., 9: Sect. Stud. Dis. Child, 1915-16.
22. Harwood, J., and O'Flynn, E.: Right Sided Hemihypertrophy Associated with Pubertas Praecox, Proc. Roy. Soc. Med. 28: 857, 1935.
23. McFarland, B. L.: Hemihypertrophy, Brit. M. J. 1: 345, 1928.
24. Glanzer, J.: Total Unilateral Hypertrophy, Am. J. Dis. Child. 45: 1056, 1933.
25. Landauer, W.: Supernumerary Nipples, Cong. Hemihypertrophy, and Cong. Hemiatrophy, Human. Biol. 11: 447, 1939.
26. Hench, P. S., Wakefield, E. G., and Camp, J. D.: Postural Sciatica in Association with Congenital Hemihypertrophy, M. Clin. North America 15: 1497, 1932.
27. Gordinier, H. C.: Case of Unilateral Hypertrophy of the Whole Left Side with Autopsy, Albany M. Ann. 39: 47, 1918.
28. Reed, E. A.: Congenital Total Hemihypertrophy, Arch. Neurol. and Psychiat. 14: 824, 1925.
29. Mayers, L. H.: Hemihypertrophy, Surg. Gynec. & Obst. 43: 746, 1926.
30. Lisser, H.: Congenital Total Hemihypertrophy, J. A. M. A. 82: 1046, 1924.
31. Cagiati, Luigi: Klinischer und pathologischer Bietrag zum Studium der halbseitigen Hypertrophie, Deutsche Ztschr. f. Nervenh. 32: 282, 1907.
32. Arnheim, G.: Ueber einen Fall von congenitalen halbseitiger Hypertrophie mit angeborenen bronchiectasien, Virchows Arch. f. path. Anat. 154: 300, 1898.
33. Hornstein, S.: Ein Fall von halbseitigem Riesenwuchses. Virchows Arch. f. path. Anat. 133: 440, 1893.

II. Limited Hypertrophy (in which one or more but not all systems are involved.)
- A. Muscular
- B. Vascular
- C. Skeletal
- D. Neurologic

Acquired

I. Total Hypertrophy
- A. Gigantism—hyperpituitarism
- B. Neurofibromatosis

II. Limited Hypertrophy
- A. Milroy's disease
- B. Elephantiasis
- C. Lipomatosis
- D. Neurofibromatosis
- E. Vascular anomalies
- F. Multiple A-V aneurysms

Congenital hypertrophy is differentiated from the acquired type in that the overgrowth is detectable at birth and originates in some developmental abnormality early in the growth of the ovum. To be classified as total hypertrophy all of the systems (neurologic, muscular, skeletal, and vascular) must be shown to be involved. Segmental hypertrophy refers to those cases wherein the involvement is limited to a digit, an extremity, one-half of the skull, or a portion of the trunk. Overgrowth of one half of the body and one or more segments of the other half is designated as crossed hypertrophy. Hemihypertrophy designates involvement of one entire half of the body in the overgrowth process. Limited hypertrophy represents a systemic delimitation of the process.

The acquired hypertrophies are obvious and need no explanation.

The particular entity which we are reporting is designated according to our classification as congenital total hemihypertrophy.

ETIOLOGY

A multitude of etiologies have been suggested in the literature in an attempt to explain the origin of congenital total hemihypertrophy. Endocrine factors,[9, 21] congenital syphilis,[9] vascular lesions,[9] abnormalities of the lymphatic system,[9, 23] lesions of the brain,[9] embryonic defects of the vegetative nervous system,[9] mechanical influences,[9] heredity, and embryogenic variants have all been incriminated. Abnormal function of the pituitary and adrenal glands[21] have been ascribed as a cause. Roentgenograms of the skulls of these patients have failed to demonstrate any abnormality of the pituitary fossa.[3, 7, 19, 22] Postmortem examination of the pituitary gland[11, 13] has been unproductive. Although enlarged adrenals have been observed on the involved side at autopsy,[21] no clinical evidence of dysfunction of this gland has been recorded. Because of their frequent association with this entity, vascular lesions have been suggested

The mothers varied in age from 16 to 43 years, and the mean age was 27.8 ± 0.26 years. The infants of 40.3 per cent of the women were their first living children; 59.7 per cent of the mothers had two or more living children. Of this group, 27.8 per cent of the women lived on farms and 72.2 per cent lived in towns or cities.

The adequacy of the supply of breast milk can be considered at two different periods: (1) when the mother is dismissed from the hospital on the ninth day (mean value), and (2) when the mother ceases to nurse entirely. When these mothers went home with their new infants, 69.0 per cent of the babies were fed breast milk exclusively, 14.9 per cent received complementary feedings and 16.1 per cent were fed by the nursing bottle alone. The average duration of breast feeding for the entire group was 2.8 ± 0.19 months.

At the time of dismissal of the mothers and children from the hospital, the adequacy of the supply of breast milk was not affected by the factor of age until after those mothers were encountered who had reached the age of 30 years, as is shown in Fig. 1. For those mothers in this older age group, there was a significant increase in the inadequacy of breast feeding as compared to those mothers less than 30 years of age. Most of the mothers more than 30 years old who had an inadequate supply of breast milk were delivered of their first living child. There was an increase of 21.4 per cent in inadequacy of breast milk among those women more than 30 years old who were delivered of their first living child as compared to the younger mothers; there was an increase of 12.9 per cent in inadequacy of breast milk for those more than 30 years of age who had more than one living child, as compared to the younger women.

However, in respect to duration of breast feeding, the mothers more than 30 years of age breast fed their babies as many months (mean value 2.8 ± 0.24 months) as did those mothers who were younger (mean value 2.8 ± 0.17 months).

On dismissal from the hospital, 32.3 per cent of those mothers with one living child had an inadequate supply of milk as compared with inadequacy of supply among 29.0 per cent of those who had more than one child. Since the duration of breast feeding was equal for each group, it can be said that the number of living children a mother has does not significantly affect the supply of breast milk either while the mother is in the hospital or after she has been dismissed.

On dismissal from the hospital, 20.4 per cent of the farm women were unable to breast feed their infants, as compared with 32.1 per cent of urban women who were not able to nurse their children. The farm women breast fed their infants (mean value, 3.36 ± 0.30 months) for a significantly longer period than did those mothers who lived in towns (mean value, 2.56 ± 0.16 months).

ENGORGEMENT

At least once daily the mothers' breasts were gently palpated to determine the day of onset of lactation and the degree of engorgement. The day that engorgement of the breasts began did influence the supply of milk available on dismissal of the mother from the hospital, as is shown in Table I, in which a progressive decrease of the duration of breast feeding is shown as the number of days to the onset of engorgement increases. At the height of engorgement,

larger than the opposite one. The vessels of the involved side may be unduly prominent. Nevi and telangiectasia are often seen. The right side is more frequently involved than the left.[5, 7, 9] Unilateral enlargement of a part or parts is usually overlooked until some difficulty is met in obtaining shoes or gloves that fit both extremities equally well. If the overgrowth is markedly prominent, the individual's appearance may become grotesque. Deformities of the feet (macrodactyly or polydactyly), scoliosis, tilting of the pelvis with associated limping, and sciatica have been noted.[7, 14, 26]

In 50 per cent of the cases there are associated abnormalities.[5, 9] Many of these are cosmetic defects which bring the patient to the physician. These deformities include abnormal nail growth,[13] premature eruption of teeth,[13] excessive secretion of sebaceous and sweat glands[13, 29] thickening of hair on the involved side,[4, 11, 29, 30] telangiectasia,[3] early appearance of varicose veins,[3] clubbed feet,[13] hypospadius,[7] cryptorchidism,[7] congenital heart disease,[7] polydactylism,[7] nevi,[5, 7, 13, 24] supernumerary nipples,[15, 25] syndactylism,[4] pigmentation of skin,[14] enlargement of the tonsil,[3] and hypertrophy of one of the paired organs on the involved side.[7] On opening the body, enlargement may be found on the hypertrophied side.[18, 31-33] This usually involves the kidney and adrenal gland. No involvement of the central nervous system or pituitary gland has been recorded.[3, 31]

The microscopic picture reveals true hypertrophy in all the systems. There is an overgrowth of the media and intima of the blood vessels,[12, 31] and the muscle bundles are larger than normal.[26] The bones also show overgrowth.[18, 31-33] Hypertrophy of the interstitial connective tissue of the peripheral nerves is likewise described.[12]

CASE REPORT

B. O., an 8-month-old, white, male infant was referred to the Salt Lake General Hospital, Pediatric Division, for therapy of meningitis.

The child was born spontaneously after a normal labor of seven hours; breathing immediately following delivery. Shortly after birth, it was observed that the right side of the infant's body was noticeably larger than the left. It was also noted that the infant had six toes on the right foot. The supernumerary digit was removed and was remarked to be highly vascular. The superficial blood vessels of the skin appeared more prominent on the right than on the left. On occasions the right side of the body would become "purple," while the left half would remain relatively normal in color. The mother stated that at 8 months the child had never sat up or crawled. The patient had been perfectly well until the onset of meningitic symptoms one week before entry into the hospital. The family history was negative for any congenital anomalies or twins.

Physical Examination.—The child was found to be acutely ill and comatose. Temperature was 101° F., pulse 140, respirations irregular. The neck was stiff and the head was kept turned to the right. The right side of the body, including the skull and extremities, was enlarged as compared to the left. Prominent veins were observed on both sides of the scalp (more marked on the left). The remainder of the examination was normal.

Laboratory Data.—Lumbar puncture revealed a cell count of 102 cells per cubic millimeter with 78 per cent polymorphonuclears and 22 per cent lymphocytes. The protein was 114 mg. per cent and quantitative sugar less than 20 mg. per cent. Blood and spinal fluid cultures were negative.

In spite of intensive fluid and chemotherapy, the patient expired the day following admission before further clinical studies could be completed.

TABLE I. DAY OF ONSET OF ENGORGEMENT AND AMOUNT OF ENGORGEMENT IN RELATION TO SUPPLY OF BREAST MILK

ENGORGEMENT	NUMBER	INADEQUATE SUPPLY OF MILK AT DISMISSAL (PER CENT)	AVERAGE DURATION BREAST FEEDING (MO.)
Day of onset			
2	23	13.0	3.2 ± 0.65
3	254	25.2	3.1 ± 0.18
4	168	39.3	2.4 ± 0.22
5	15	58.8	1.8 ± 0.60
Grade			
1	64	50.0	1.9 ± 0.29
2	317	26.8	3.0 ± 0.15
3	70	25.7	2.7 ± 0.36
4	11	72.7	0.9 ± 0.60

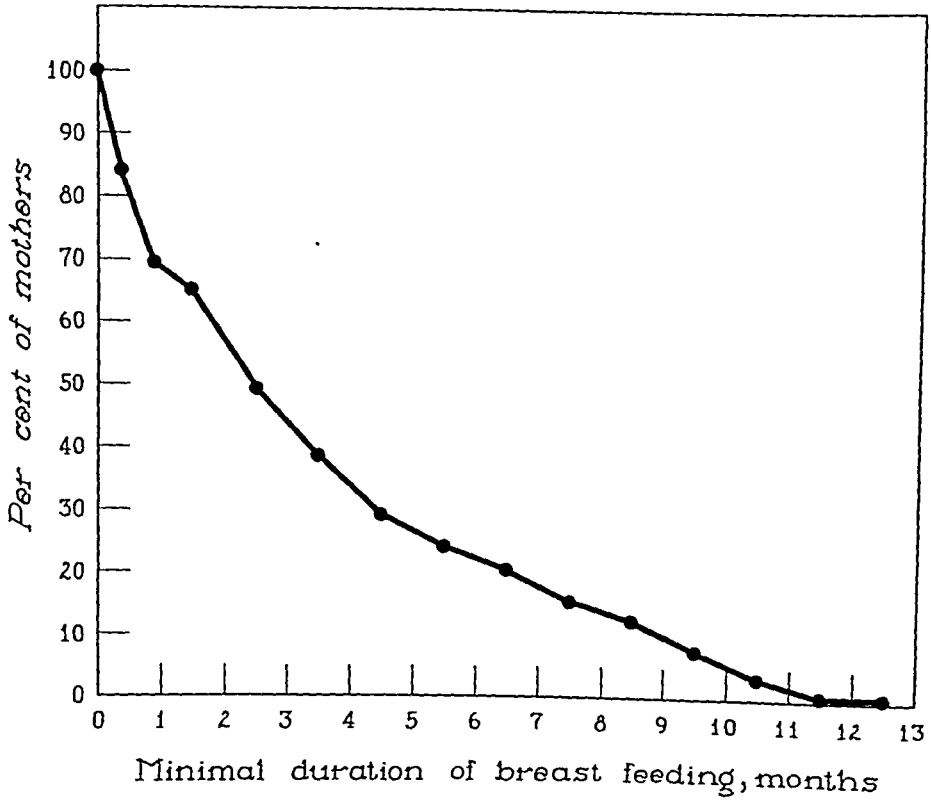


FIG. 2.—Cumulative percentage for mothers' breast feeding for the indicated minimal number of months. The ordinate gives the percentage of all mothers studied who breast fed their infants for any number of months. For instance, 60 per cent of the mothers breast fed their infants for one and three-fourths months or more, 30 per cent breast fed their infants for four and a half months or more.

Weight of the baby at birth did not influence the adequacy of lactation on dismissal of the mother from the hospital. The correlation coefficient between the birth weight of the infant and the duration of breast feeding was = 0.05,* which is not significant.

*The random probability of getting a correlation as large as 0.05 in samples of this size is 0.49; only probability values equal to or less than 0.05 generally are considered to be statistically significant.

NECROPSY REPORT*

External Appearance.—The body was that of a well-nourished male infant, measuring 68 cm. in length. There was striking asymmetry of the body, including head, trunk and extremities. The entire right side of the head was larger than the left side. The frontal boss of the right side was particularly prominent and the right side of the face appeared to droop below the level of the left side. The anterior fontanel measured 5 cm. in its greatest diameter and the posterior fontanel was nearly closed. The hair had been shaved from the left half of the scalp and numerous small linear hemorrhages were visible through the epidermis of the shaved area. The circumference of the head over the frontal bosses and occiput was 64.7 cm. The irises were dark blue, the pupils round and equal in size, and the conjunctiva were pale. The lower jaw was rigid and a small quantity of frothy fluid exuded from the mouth. The visible portions of the buccal mucosa were pale.



Fig. 2.—There is an increase in the thickness of the soft-tissue shadows of the right half of the thorax and abdomen as compared to the left.

The cervical lymph nodes were not palpable. There was slight greenish-gray discoloration of the skin of the trunk and punctate hemorrhages, surrounding needle puncture holes, were present on both sides in the upper anterior part of the thorax. The penis showed orange-red discoloration and appeared to be superficially excoriated.

The right upper extremity was longer and had a greater diameter than the left. The over-all length of the right was 22 cm. and of the left, 20 cm. The right lower extremity measured 23 cm. in length and the left measured 21 cm. In an incision through the skin and subcutaneous tissue of the anterior surface of each thigh, the fat measured 0.8 cm. in thickness on the right side and 0.5 cm. on the left.

Primary Incision.—The subcutaneous fat in the midline measured up to 0.5 cm. in thickness. Upon palpation, the abdominal wall was found to be slightly thicker on the right side than on the left. No abnormalities of the muscles were noted.

*Dr. Crichton McNeil, University of Utah School of Medicine.

PORTAL CIRRHOSIS OF THE LIVER

Case Report With Discussion of Problems

Walter M. Block, M.D.
Cedar Rapids, Iowa

A CASE of hepatic cirrhosis in a boy 11 years of age is presented, because it is felt that any information is worth while which may throw some light on a relatively uncommon disease whose cause is still unknown.

In this institution, only three proved cases of primary liver cirrhosis in children occurred during the past twenty years One was that of a boy 7 weeks old, and two were those of girls, 2 and 6 years old, respectively. Three other patients were clinically suspected of having had the disease, but died outside of this hospital and autopsy was not performed "Cardiac" cirrhosis, due to chronic, passive congestion of the liver was seen in four children with primary heart disease (Table I).

Further statistics concerning the frequency of cirrhosis in children are cited by Moon [1]

CASE REPORT

R J, an 11 year old white boy, was admitted to the Children s Hospital on Nov 5, 1946, with entrance complaints of abdominal swelling for three weeks and jaundice for four weeks

The patient's past history was not contributory The mother's pregnancy was uncomplicated, the delivery was normal, the birth weight was 10 pounds. The child was bottle fed, made normal development, and had never been seriously ill He had measles, pertussis, chicken pox, and an episode of "strep throat," all without complications. The family history revealed that he was the son of a minister, that there were six siblings, two of whom had died (a boy, aged 24 years, of encephalitis, and a boy, aged 3 years, of pneumonia). There was no history of any familial or liver diseases, syphilis, or tuberculosis in the family.

The patient's present illness began in September, 1946, when he complained of loss of appetite Prior to September he had been in perfect health Loss of "pep" was then noticed by the boy's parents, as well as fever of 101° F orally. Nausea and a few episodes of vomiting were the subsequent complaints Jaundice, together with dark urine and clay colored stools were noticed about October 10 At that time a physician saw the patient and diagnosed "virus hepatitis" Soon thereafter, "swelling" of the abdomen developed; the jaundice decreased, the stools regained normal color, but the abdominal swelling increased. Toward the end of October he was taken to a hospital where paracentesis yielded 3 L of lemon yellow fluid The illness became progressively more severe The boy began to complain of weakness and pain in the knees, and later also in the ankles and wrists He became dyspneic and was brought to this clinic

Physical examination revealed a well developed, very well nourished, husky looking boy who appeared acutely ill and was in obvious respiratory distress There was an icteric tint to the sclerae, marked distention of the abdomen, and dilatation of the superficial chest and abdominal veins Other positive findings consisted of hypertrophic tonsils, dullness to percussion with diminished breath sounds over the lower, left, posterior, and lateral chest wall. The heart presented no unusual findings and the blood pressure was 140/70

The peritoneal cavity appeared to be filled with fluid There was a healing paracentesis wound just below the umbilicus The liver was felt 8 cm below the right costal

From the Department of Pediatrics College of Medicine, State University of Iowa

tional surfaces were dull; pale tan and lobular markings were indistinct. The lumen of the gall bladder contained about 5 c.c. of clear, pale-yellow bile.

Stomach and Intestine.—The stomach was approximately normal in size and shape. The mucosal rugae were flattened out. The duodenal mucosa was stained yellowish, and the lumen of the entire small intestine contained yellow chyme. The appendix appeared normal upon gross inspection. The lumen of the colon contained only a small quantity of yellowish-brown formed feces. The mucosa was normal in appearance throughout.

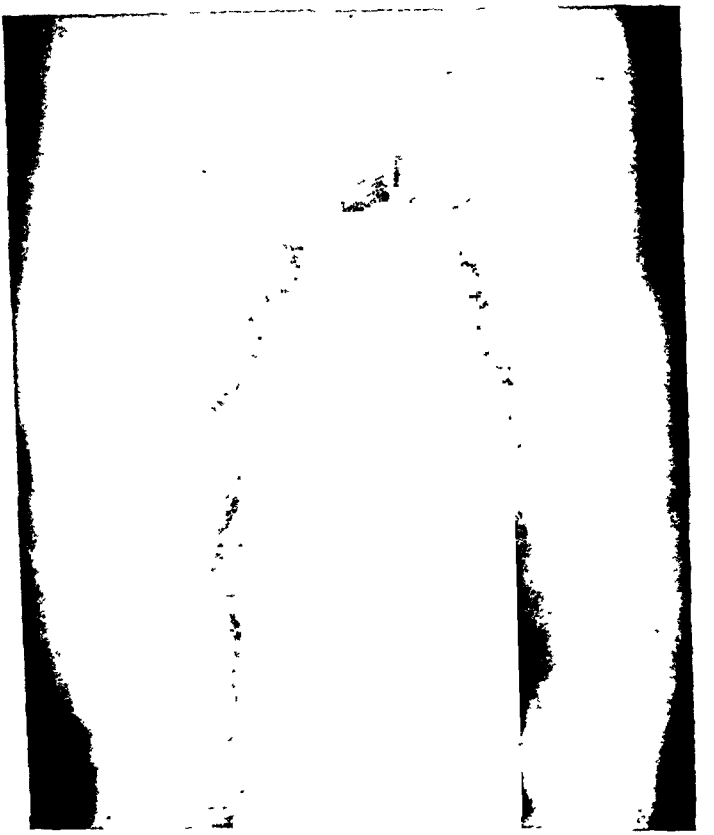


Fig. 4.—There is a marked increase in the size of the soft-tissue shadows of the right lower extremity as compared to the left.

Genitourinary Tract.—The kidneys were about equal in size and weighed about 50 Gm. each. The cortical surfaces were smooth and showed persistent fetal lobation. The cortex measured about ½ cm. in thickness and bulged slightly at the margins of the incised capsules. The lining of pelves and calyces appeared to be normal, the ureters were patent and of normal diameter. The urinary bladder measured about 3 cm. in diameter, and its lining was not remarkable.

Head.—The asymmetry of the skull included the base as well as the calvarium; the base also was appreciably larger on the right side.

When the dura mater was removed, there was an escape of cloudy cerebrospinal fluid. There was abnormal opacity of the leptomeninges of the entire convexity, especially along the courses of the blood vessels in the sulci, apparently due to infiltration by purulent exudate. The infiltration also involved the base of the brain and was particularly dense in the region of the larger vessels.

A working diagnosis of inflammatory liver disease was made. During his short hospitalization, the patient's temperature fluctuated between 102° and 103° F. rectally. The lowest readings were 100.2° F. on two occasions. The pulse rate followed the temperature curve. Preoperatively, the respiratory rate averaged 40 to 44 per minute.

Treatment was symptomatic at first, but penicillin in large doses, intramuscularly as well as intravenously, was soon administered. November 7, the third hospital day, the patient's condition was markedly impaired. He appeared very toxic, three emeses of "coffee-ground"-like material occurred, and the patient, mentally confused, had a mild, clonic convulsion. The blood pressure was 137/80 at that time. An exploratory laparatomy was decided on and was performed November 9. On opening the abdomen, 2,500 c.c. of straw-colored fluid escaped from the peritoneal cavity. The liver looked yellowish in color, and was of nodular, "hob-nail" character. The spleen was found to be two to three times its normal size. A biopsy of the liver was done, and splenectomy as well as omentopexy was performed. These were carried out because there was little else to offer this patient and it was thought that the latter two procedures might be instrumental in lightening the venous blood flow through the portal veins. The immediate postoperative condition of the patient was fairly good. However, he expired in the morning of the second postoperative day.

NECROPSY REPORT* (ABSTRACT)

Necropsy revealed severe portal cirrhosis with jaundice and ascites. Four thousand cubic centimeters of yellow, bile-tinged, moderately foul smelling fluid were removed from the peritoneal cavity. The liver weighed 1,250 Gm., was essentially normal in contour, but showed a generalized, severe, hob-nail type of cirrhosis (Fig. 1). The capsule of the liver was thickened and fibrotic and the liver parenchyma consisted of pinhead-sized to pea-sized masses of deeply stained, yellowish green, regenerated liver lobules (Fig. 2). It cut with considerable resistance. The normal architecture of the liver was considerably deranged by the multiple nodules previously mentioned. There was no gross evidence of hemorrhage, necrosis, or fatty replacement in the liver, and no abscess was found.

Sections showed many lobules of liver cells widely separated and walled off by considerable dense fibrous tissue in which there were numerous proliferating bile ducts and scattered groups of hepatic cells and ductal epithelium (Fig. 3). There was no lobular orientation in the groups of liver cells. Most of the cells were large and irregular and contained many vacuoles and yellowish brown granules in the cytoplasm. The nuclei of many appeared normal but in others the nuclei were seen to be large and very vesicular and in many no nucleus was seen at all. There was extensive degeneration of the liver cells of the proliferating, regenerating nodules (Fig. 4). The fibrous tissue was seen to be moderately and diffusely infiltrated with lymphocytes. A few small areas of focal hemorrhage were present also. Mallory's aniline blue stain of a section of liver confirmed the presence of increased amounts of fibrous connective tissue about the irregular liver lobules. Sudan III fat stain showed many small droplets of free fat present in the liver cells. Levaditi stain of the liver failed to reveal any *Treponema pallidum*.

The spleen weighed 340 Gm. There was moderate congestion of back-pressure type. Microscopic sections revealed increase in the fibrous tissue of the pulp, dilated sinuses, and small Malpighian corpuscles. There were no siderotic nodules, and no more pathologic changes than expected with hepatic cirrhosis (Fig. 5).

The lungs were congested and edematous and showed many areas of atelectasis, violent, necrotizing pneumonia, and focal, interstitial hemorrhages. The heart was marked by petechiae, somewhat hypertrophied, and dilated and flabby.

Incidental findings included edema and low-grade inflammation of the colon; petechiae of the stomach, small bowel, and colon; an infected and necrotic leiomyoma of the cecum; hyperplasia of the bone marrow; and atrophy of the testes and gynecomastia. Microscopic sections of the breast tissue (Fig. 6) showed marked proliferation of the ducts, lined by a hyperplastic epithelium and surrounded by a light, vascular, fibrous, tissue stroma.

*Acknowledgment is made to Dr. E. D. Warner, head of the Department of Pathology, for interpretation of the reproductions.

The presence of a supernumerary toe and the abnormal vascularity facilitated the early detection of the hemihypertrophy at birth. The diagnosis depends on the sensitization of the examiner to the entity. Often it escapes recognition until marked physical or mental abnormalities are produced.

The "purplish" discoloration on one side of this child's body worried the mother. The possibility of subnormal mental development, suggested by the fact that the baby never cried, crawled, or sat up, caused no concern. It was used to label the child an "exceptionally good baby."

If the hemihypertrophy and supernumerary toe had not been noted at birth, the question of wthe meningitis contribution to the development disturbance might be raised. However, this is obviously not to be considered in this case.

There is no suggested etiologic factor which satisfactorily explains all the variations seen with hemihypertrophy. The theory of an imbalance of normal twinning is the most accepted explanation to date.

SUMMARY

1. The literature pertaining to hemihypertrophy is reviewed.

2. A more applicable classification is suggested.

3. The etiologic, clinical, and pathologic findings are discussed.

4. A case of congenital total hemihypertrophy with necropsy findings is reported.

REFERENCES

1. Dorland, W. A. N.: American Illustrated Medical Dictionary. W. B. Saunders Co., 1944, Philadelphia.
2. Penfield, W., and Robertson, J. S. M.: Growth Asymmetry Due to Lesions of Post central Cerebral Cortex, Arch. Neurol. and Psychiat. 50: 405, 1943.
3. Halperin, G.: Normal Asymmetry and Unilateral Hypertrophy, Arch. Int. Med. 48: 676, 1931.
4. Gesell, A.: Hemihypertrophy and Mental Defect, Arch. Neurol. and Psychiat. 6: 400, 1921.
5. Gesell, A.: Hemihypertrophy and Twinning; Further Study of Nature of Hemihyper trophy with Report of New Case, Am. J. M. Sc. 173: 542, 1927.
6. Lenstrup, E.: Eight Cases of Hemihypertrophy, Acta. Pediat. 6: 205, 1926.
7. Wakefield, E. G., and Hines, E. A., Jr.: Congenital Hemihypertrophy; Report of Eight Cases, Am. J. M. Sc. 185: 493, 1933.
8. Petre, A., Schere, S., and Pellerano, J. C.: Congenital Hemicorporal Dysharmonies, Arch. argent. de pediat. 10: 294, 1939.
9. Schwartzman, J., Grossman, L., Dragutsky, D.: True Total Hemihypertrophy, Arch. Pediat. 59: 637, 1942.
10. Aragon, E. Toussaint: Left Total Congenital Hemihypertrophy; Case, Rev. mex. de pediat. 12: 343, 1942.
11. Rugel, S. J.: Congenital Hemihypertrophy, Am. J. Dis. Child. 71: 530, 1946.
12. Lehman, E. P.: Recklinghausen's Neurofibromatosis and Skeleton, Arch. Dermat. and Syph. 14: 178, 1926.
13. Scott, A. J.: Hemihypertrophy; Report of Four Cases, J. PEDIAT. 6: 650, 1935.
14. Sayer, A., and Fatherree, T. J.: Congenital Hemihypertrophy; Report of a Case, U. S. Nav. M. Bull. 44: 142, 1945.
15. Wiseberg, M.: Unusual Case of Hemigigantism, Canad. M. A. J. 25: 591, 1931.
16. Crosby, E. H.: Hemihypertrophy Totalis; Case Report, J. Bone and Joint Surg. 17: 1025, 1935.
17. Moore, B. H.: Some Orthopedic Relationships of Neurofibromatosis. J. Bone and Joint Surg. 23: 109, 1941.
18. Hofmann, Max: zur Pathologie des Angeborenen Partiellen Riesenwucheses Bietr. Z klin Chir 48: 391, 1906.
19. Barr, D. P.: Congenital Hemihypertrophy and Partial Gigantism, J. Missouir M. A. 26: 298, 1929.

Until more is known about the cause of this disease, it appears that the simple, conventional classification into three groups, namely, syphilitic, portal, and biliary cirrhosis, is satisfactory for pediatric use, since it at least prevents

Fig. 3.

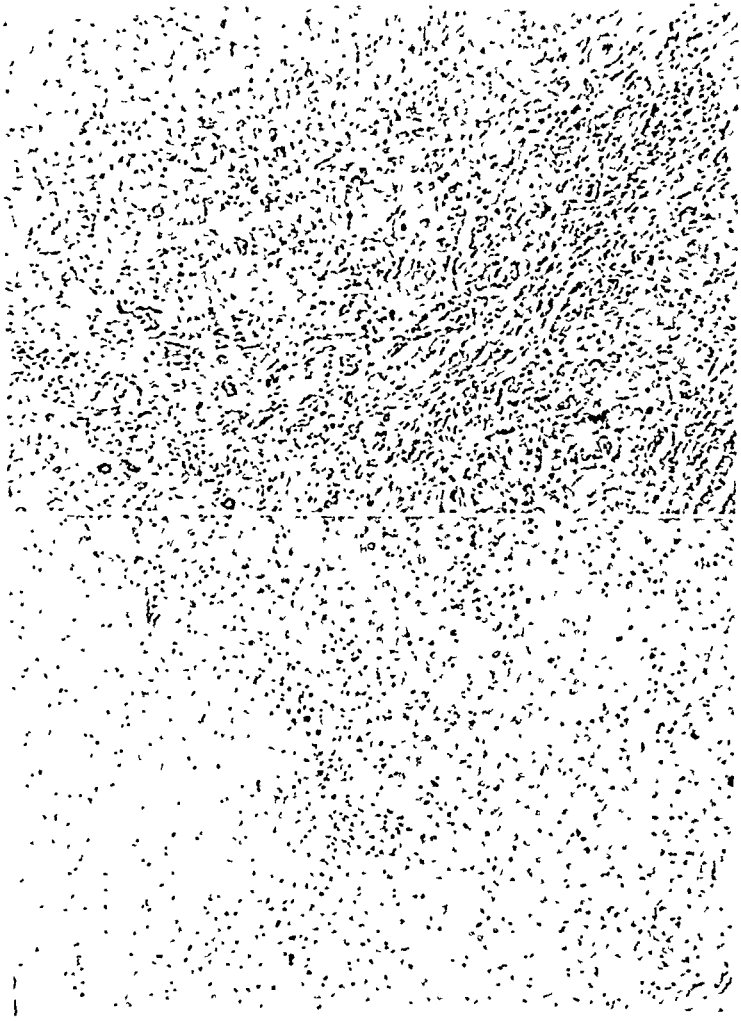


Fig. 4.

Fig. 3.—Numerous proliferative bile ducts in scar tissue between nodules of hepatic cells.
Fig. 4.—Necrosis in nodule of hepatic cells.

misunderstandings. With due respect to many scientists, the complicating use of surnames should be abolished, in the case of this as well as most other diseases, thus eliminating the question of what constitutes true "Laennec's" cirrhosis, or which form of biliary cirrhosis, if any, can rightfully be called "Hanot's" cirrhosis.

Pathologic descriptions should not be included in the terminology, but should be reserved for the pathologist to elaborate on in his report. This in-

SOME FACTORS WHICH INFLUENCE THE DURATION OF BREAST FEEDING

MILDRED A. NORVAL, M.D.*
ROCHESTER, MINN.

THIS report is concerned with the relationship of certain maternal and infant factors to the duration of breast feeding. The maternal considerations were age, number of living children, the amount and duration of breast engorgement, and the urban or rural dwelling place of the mother. The only factor considered in the baby was the weight at birth. None of these factors can be considered as entirely independent of the psychologic attitude of the mother toward breast feeding. However, in this particular group of mothers, all expressed the desire to breast feed their infants, so that this attitude probably is of less importance here than in the usual cross-section of mothers.

It has been stated[1-4] that defective lactation occurs most often in primiparas more than 30 years old and in those who are very young. Hamill quoted van Swieten[5], who said that the optimal age for wet nurses was between 25 and 30 years. Stewart and Pratt[4] found that the incidence of complete breast feeding decreased as the age of the mothers increased. Others[6,7] have found that the age of the mother made no difference in her ability to nurse an infant.

Multiparous women are believed by some[5,8] to have more milk than primiparous women. Martin[9] found, among 10,178 mothers who nursed their infants, that 40 per cent were primiparas and 52 per cent were multiparas. Others[4,10] believe that parity does not influence lactation.

Almost nothing is found in the literature concerning the onset or amount of engorgement and its relationship to lactation. Hamilton[11] said that delay in the appearance of engorgement is no indication that breast feeding will be unsuccessful. McNeil[12] found that difficulties in lactation arose when massive, early engorgement occurred.

Many have written about the effect of emotional states[1, 3, 4, 13, 14] and fatigue[15] on the secretion of breast milk. Darner and Hunter[16] found that 18 per cent more mothers were able to supply breast milk for their babies if no visitors were allowed during the hospital stay. Worcester[14] said that the social demands on modern mothers conflict with the babies' right to suckle. He felt that too many mothers expected to be entirely free from the care of their babies in order to attend to outside duties and pleasures.

The best-known galactogogue is a vigorous nursing infant. It would seem, therefore, that the stimulus of sucking would be increased as the weight of the infant increases. Some relationship has been found to exist between the demands[1, 17, 18] and the weight at birth[6, 19-21] of the infant and the amount of breast milk secreted.

In this study we used the records of 462 mothers who were delivered of full-term normal babies and whose duration of breast feeding was known. All of them, after delivery, expressed the desire to feed their infants at the breast.

*Fellow in Pediatrics, Mayo Foundation, Rochester.

spleen. The organisms cultivated from the liver of the boy showed a definite tendency to infect the livers of experimental animals (rabbits). Moon postulates, therefore, that "chronic infection of the liver should be regarded among the important causes of cirrhosis." More recently, Harrell and McBryde,[5] in an instructive review of the subject of juvenile cirrhosis, reported twenty cases of this illness, among them one of a 16-year-old girl whose acute cirrhosis they believed to be due to "infection of the peritoneum, and probably of the liver, with an atypical species of Escherichia."



FIG. 6.—Section of breast tissue, showing proliferation of ductal epithelium and periductal stroma.

The fact that colon bacilli were cultured from the ascitic as well as pleural fluid in our case, makes one think of the possibility of an infectious cause of the boy's cirrhosis. However, there is no proof that such was the case.

It may be worth while recalling that liver cirrhosis has been mentioned in the literature as a sequel of acute infectious diseases, among them scarlet fever, enteritis, endocarditis, and others (Seitz, Bingel, and Bolton, as mentioned by Moon[4]). However, the evaluation of some reports should be made with care, since instances of cirrhosis due to "infection" of unspecified nature (Laurie,[6] and Calvin and Saffro[7]) may well have been the end stages of what now is known as infectious hepatitis.

As yet proof is scarce that fatal cases of infectious hepatitis may terminate in cirrhosis. In fact, Lucke[8] emphasizes that the histologic picture in these cases is invariably that of "idiopathic yellow atrophy," and not that of scarring. His interpretations, however, have not been universally accepted.

It is very tempting to assume that some instances of juvenile cirrhosis, fitting like this case into the pathologic picture of "toxic cirrhosis" as described by Mallory, may have been caused by what formerly was termed catarrhal jaundice and has been found to be a virus infection of the liver.

if it was present, the degree of engorgement was graded as follows: grade 1, little or no engorgement; grade 2, moderate firmness of the breasts; grade 3, hard; firm breasts that become soft within two to four days; grade 4, hard, firm breasts that do not become soft until after four days. Those women who had engorgement of grade 1 or grade 4, as shown in Table I, had less success in breast feeding their infants than did those who had engorgement of grade 2 and grade 3. Since only eleven women had massive engorgement of grade 4, these data have little statistical significance. However, it is an interesting clinical observation that 72.7 per cent of those mothers (eleven) with prolonged

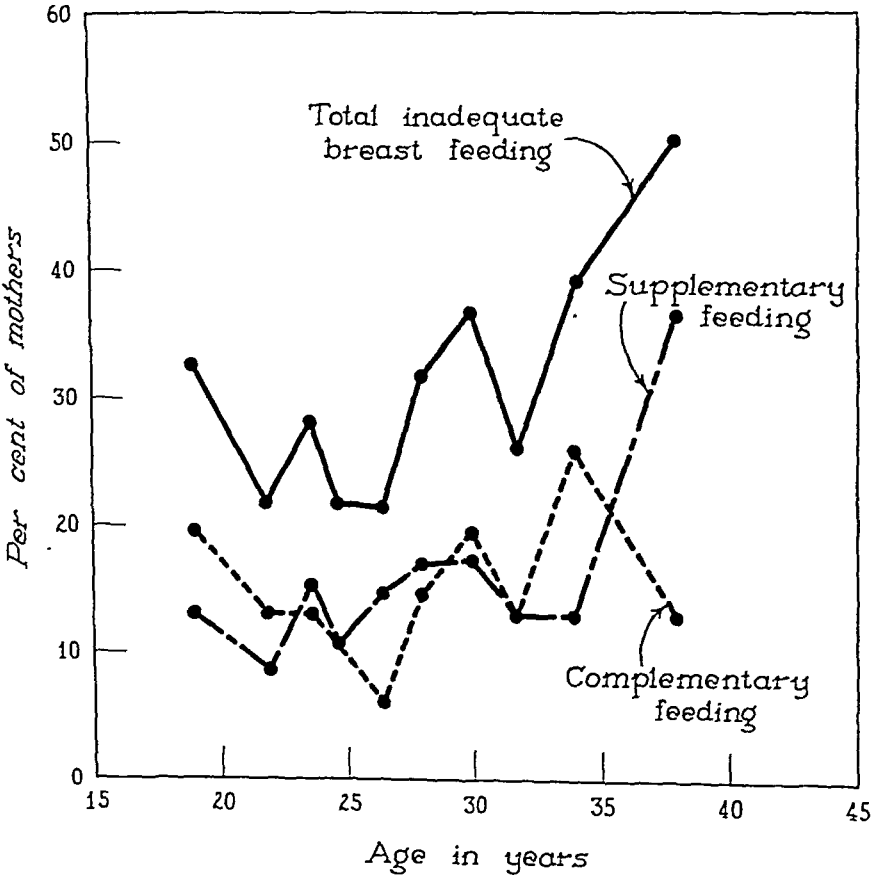


Fig. 1.—Percentage of mothers with inadequate breast feeding.

engorgement of grade 4 had an inadequate supply of breast milk at the time of their dismissal from the hospital. The duration of breast feeding was significantly decreased 1.1 ± 0.31 months among those mothers with engorgement of grade 1 and engorgement of grade 4 as compared to the duration of breast feeding among those whose engorgement was of grade 2 or grade 3. Other maternal factors considered were weight at the onset of pregnancy, height and the weight-length ratio as an index of body build. These factors did not influence the supply of breast milk.

Infectious mononucleosis can produce clinical pictures similar to this one, with jaundice, enlargement of the liver, fever, falsely positive Wassermann reaction, and even involvement of the central nervous system (Vaughan and associates[14]). However, a study of the white blood cells did not support such a diagnosis. The Paul-Bunnell test performed with post-mortem blood, was negative.

Liver disease due to chemical toxins (as phosphorus, arsenicals) could be ruled out by absence of a history of contact with any such chemicals. Thyrotoxic effects on the liver, leading to cirrhosis (Moon,[15] Barker[16]) were certainly not active, as there were no symptoms or signs of thyroid disease in the case of this boy.

Early in his history, however, there were complaints of abdominal distress, nausea, and vomiting, and fever of 101-102° F. These symptoms could very well be interpreted as signs of appendicitis. It was thought that the patient's present illness may possibly have been a subphrenic, or even a liver abscess, due to such a previous attack of appendicitis. It was mainly because of this consideration, as well as a likelihood of certain death otherwise, that surgery was performed.

Finally, a diagnosis strongly to be considered was that of so-called "Banti's disease." Much controversy has been going on about this disease, and a review of the literature reveals a general tendency, especially on the part of pathologists, with Moon[1] in America and Rössle[17] in Germany as their main advocates, to abandon the expression "Banti's disease." Moon objects strongly to the acceptance of Banti's disease as a separate entity, since it is "clinically and pathologically indistinguishable from atrophic cirrhosis." He suggests the name of "hepatosplenic disease" as more adequate. This represents the English equivalent to the well-known German expression of "Hepatolienale Erkrankungen" (Eppinger). Barker[16] also "confesses," as he puts it, that he too is "very doubtful of the unitary existence of any malady that is responsible for the whole group of cases described in the bibliography as "Banti's disease." He states that many of the cases described as Banti's disease, turned out to be instances of chronic pylephlebitis, and atrophic cirrhosis of the liver with stasis in the spleen.

Poynton and Wyllie[18] claim that absence of leucocytosis, a low hemoglobin, and gastrointestinal hemorrhages help to recognize Banti's disease. All three of these findings, however, may be present in primary liver cirrhosis also.

Langmead[19] finds the diagnosis of "splenic anemia" (i.e., Banti's disease) justified in those cases in which the splenomegaly is believed to have preceded the enlargement of the liver and in which there is considerable anemia. However, newer studies have shown that even in primary liver cirrhosis, splenomegaly may occur before enlargement of the liver can be found.

Perhaps a compromise may be acceptable by recognizing a separate clinical syndrome of splenomegaly with anemia, with or without leucopenia, with intermittent fever and hemorrhages from mucous surfaces, in which surgical exploration with biopsy of liver tissue fails to reveal any liver abnormality.

Wide variation is encountered in the literature as to the duration of breast feeding. In Fig. 2 is shown the cumulative percentage for mothers who fed their infants at the breast for the indicated number of months or more. It is interesting to note that the sharpest decrease occurs within the first month. Hence, this is the period for physicians to concentrate on, if breast feeding is to be prolonged. Half of the mothers abandoned breast feeding as a source of food for their infants within two and a half months.

SUMMARY AND CONCLUSIONS

The duration of breast feeding in a group of 462 women was investigated in relation to certain factors in both the mothers and their infants. After women reach the age of 30 years, there is a decrease in the adequacy of the supply of breast milk, particularly among those delivered of their first living child. As was evidenced by the number of infants who were being breast fed at the time of dismissal of their mothers from the hospital, the age of the mother did not affect the duration of breast feeding, once it had become established. Parity did not influence the supply of breast milk. Those women who lived in the country breast fed their infants 0.8 months longer than those who lived in a town or city. As the number of days before onset of engorgement increased, there was a decrease in the adequacy of breast feeding, seen both on dismissal of the mother from the hospital and as a decrease in the duration of breast feeding. It is an interesting observation that, on the one hand, those women who had engorgement of grade 1 and, on the other hand, those who had engorgement of grade 4, were less able to breast feed their infants than were those women who had engorgement of grade 2 or grade 3. The birth weight of the infant did not influence the adequacy of the supply of milk or the duration of breast feeding.

REFERENCES

1. De Lee, J. B., and Greenhill, J. P.: The Principles and Practice of Obstetrics, ed. 8, Philadelphia, 1943, W. B. Saunders Company, 1,101 pp.
2. Routh, C. H. F.: Infant Feeding and Its Influence on Life; or the Cause and Prevention of Infant Mortality, ed. 3, New York, 1879, William Wood and Company, 270 pp.
3. Routh, C. H. F.: M. Times & Gaz., Lond. n. s. 18: 467; 494; 520; 573, 1859.
4. Stewart, H. L., and Pratt, J. P.: West. J. Surg. 49: 98, 1941.
5. van Swieten, Gerhard: Quoted by Hamill, S. McC.: Am. J. M. Sc. 125: 1044, 1903.
6. Carlson, Mathilda: Arch. Pediat. 38: 568, 1921.
7. Robinson, Margaret: Arch. Dis. Child. 17: 23, 1942.
8. Hughes, E. L.: Brit. M. J. 2: 69, 1942.
9. Martin, G.: Arch. f. Gynäk. 74: 513, 1905.
10. Neale, A. V., Cassie, Ethel, Braid, Frances and Pierce, Mila: Arch. Dis. Child. 18: 59, 1943.
11. Hamilton, C. K. J.: Practitioner 142: 187, 1939.
12. McNeil, Charles: Practitioner 150: 193, 1943.
13. Grulee, C. G.: Proc. Inter-State Postgrad. M. A. North America (1943), 1944, pp. 135-137.
14. Worcester, A.: Boston M. & S. J. 143: 361, 1900.
15. Richardson, F. H.: Hygeia 20: 224, 1942.
16. Darner, C. B., and Hunter, G. W.: Am. J. Obst. & Gynec. 45: 117, 1943.
17. Moore, C. U.: Arch. Pediat. 36: 609, 1919.
18. Sedgwick, J. P.: Am. J. Dis. Child. 21: 455, 1921.
19. Gedda, E.: Nord. hyg. tidskr. 21: 185, 1940.
20. Wardlaw, H. S. H., and Dart, E. E. P.: M. J. Australia 2: 377, 1934.
21. Wardlaw, H. S. H., and Dart, E. E. P.: M. J. Australia 2: 564, 1932.

authors concluded that gynecomastia and atrophy of the testes are striking concomitants in the majority of cases of liver cirrhosis. Physical examination and pathologic studies revealed that in the case of this boy also, gynecomastia and testicular atrophy were present.

SUMMARY

1. A case of portal cirrhosis in an 11-year-old boy is presented, together with the pathologic findings observed during necropsy.

2. The terminology and pathogenesis are reviewed, as well as the differential diagnosis, especially in regard to "splenomegalic anemia."

3. The thought is advanced that infectious hepatitis may terminate in cirrhosis.

REFERENCES

1. Moon, V. H.: Am. J. Dis. Child. 46: 375, 1933.
2. Levy, W., Greenstein, N. M., and Leighton, B.: J. PEDIAT. 15: 91, 1939.
3. Evans, P. R.: Arch. Dis. Child. 14: 89, 1939.
4. Moon, V. H.: Am. J. M. Sc. 177: 681, 1929.
5. Harrell, G. T., and McBryde, A.: Am. J. Dis. Child. 59: 1301, 1940.
6. Laurie, N. S.: M. J. Australia 1: 178, 1935.
7. Calvin, J. K., and Saffro, L. B.: Am. J. Dis. Child. 43: 914, 1932.
8. Lucke, B.: Am. J. Pathol. 20: 471, 1944.
9. Mallory, T. B.: Am. Practit. 1: 323, 1947.
10. Krarup, N. B., and Roholm, K.: Acta Med. Scand. 108: 306, 1941.
11. Weber, F. P.: The Lancet 1: 365, 1936.
12. Bridgeman, M. L., and Robertson, T. D.: Am. J. Dis. Child. 43: 1153, 1932.
13. Yater, W. M.: Med. Ann. Distr. Columbia 12: 264, 1943.
14. Vaughan, S. L., Regan, J. S., and Terplan, K.: Blood 1: 4, 1946.
15. Moon, V. H.: Arch. Path. 18: 381, 1934.
16. Barker, L. F.: Med. Clin. N. Am. 14: 99, 1930.
17. Rössle, R. in Henke, F., and Lubarsch, O.: Handbuch der spez. Anat. und Histol., Bd. 5, 1. Teil, Berlin, 1930, J. Springer, page 278.
18. Poynton, F. J., and Wyllie, W. G.: Arch. Dis. Childh. 1: 1, 1926.
19. Langmead, F.: Proc. Roy. Soc. Med. 27: 939, 1924.
20. Curtiss, C. C.: Arch. Pediat. 51: 396, 1934.
21. Kelly, A. D.: Am. J. Dis. Child. 51: 480, 1936.
22. Asslestine, St. M.: J. Canad. M. A. 24: 545, 1931.
23. Ratnoff, O. D., and Patek, A. J., Jr.: Medicine 21: 207, 1942.
24. Glass, S. J., Edmondson, H. A., Soll, S. N.: Endocrinol. 27: 749, 1940.

TABLE I CASES OF JUVENILE CIRRHOSIS OBSERVED DURING THE PAST TWENTY YEARS AT THE CHILDREN'S HOSPITAL

Diagnosis established by necropsy	1. Girl, 14 years; "Banti's" disease and portal cirrhosis 2 Boy, 7 weeks; periportal cirrhosis. No obstruction of bile ducts found 3. Girl, 6 years; portal cirrhosis with typical "hob nail" liver
Diagnosis clinically suspected	1. Girl, 11 years; ulcerative colitis; chronic nephritis; probable cirrhosis of the liver. Died two years after last seen 2 Boy, 4 years; possible liver cirrhosis Died several months after last seen, with much ascites 3 Girl, 11 years; splenohepatomegaly; Banti's disease or primary liver cirrhosis Died several months after last seen
"Cardiac" cirrhosis Diagnosis established by: 1) Necropsy Cases 1, 2, 3 2) Surgical exploration Case 4	1. Girl, 13 years; adhesive pericarditis; perisplenitis; ascites and mild cirrhosis of the liver 2 Girl, 4 years; rheumatic carditis; chronic, passive congestion of liver and spleen with ascites 3 Girl, 11 years; rheumatic fever: verruco-e endocarditis; chronic, passive congestion of liver and spleen 4 Girl, 16 years; adhesive pericarditis; chronic, passive congestion of liver with signs of cirrhosis. Diagnosis established during surgery (cardiolysis): patient living and well

margin, was firm, and very tender to palpation. The spleen could not be felt. There was mild, pitting edema of the lower legs.

Report of X ray Examination of the Chest.—(Dr. C. L. Gillies.) "A single film of the chest taken with the patient upright shows both leaves of the diaphragm to be elevated There is no fluid in the left pleural cavity. The heart does not appear to be enlarged. The lung fields are clear. Fluoroscopically, excursions could be observed along the left border of the heart which appeared to be of normal amplitude."

Laboratory Studies.—Five urine examinations revealed satisfactory concentration, a trace of sugar in two of the specimens, and a trace of albumin in the last one specimen, which also contained a few, finely granular casts. Microscopic examination of the urine was otherwise negative Blood studies showed the hemoglobin to be 11.35 Gm. per 100 c.c. (Newcomber method), a red cell count of 3,470,000, and three white cell counts varying between 10,000 and 12,250 cells per cubic millimeter. The differential count showed 1 per cent basophiles, 2 per cent eosinophiles, 12 per cent stab cells, 61 per cent segmented polymorphonuclear cells, 22 per cent lymphocytes, and 2 per cent monocytes. The polymorphonuclear cells showed marked, toxic granulation. The platelet count was 68,000 prior to splenectomy, and 92,000 one day postoperatively. The reticulocyte count was 5.3 per cent and 4.3 per cent on the first postoperative day. Other blood studies showed the following values: hematocrit, 32 per cent; bleeding time, 6 minutes; coagulation time, 7 minutes; and prothrombin time, 2 minutes, 26 seconds (Control, 41.1 seconds). Fragility test of the erythrocytes showed hemolysis to begin at 0.42 per cent of saline solution and to be complete at 0.35 per cent

Chemical studies of the blood revealed the following values per 100 c.c.: serum bilirubin, 6.5 mg (post mortem, 25.6 mg.); cholesterol, 151 mg.; cholesterol esters, 58.5 mg or 38.5 per cent of total cholesterol; nonprotein nitrogen, 27.2 mg.; total proteins, 6.6 Gm.; albumin, 1.4 Gm.; globulin, 5.0 Gm.; fibrinogen, 0.2 Gm.; van den Bergh reaction, prompt direct

Serologic reactions of the blood showed Kahn, Kline, Kolmer tests to be 4 plus positive (post mortem, Kahn test 3 plus positive, Kline and Kolmer tests, negative). Heterophile antibody test (post mortem), negative. Examination of the stools showed two specimens negative for ova, parasites, or cysts Culture of stool was negative for Eberthella, Salmonella and Shigella groups

Examination of ascitic fluid showed a yellowish color; the specific gravity was 1.0145; nonprotein nitrogen, 27 mg. per 100 c.c. of fluid; proteins, 0.444 Gm. per 100 c.c. of fluid; culture revealed *Escherichia coli* Culture of pleural fluid revealed the same organism. One blood culture was negative.

carious cavity in the lower incisor, which is very rarely affected. Yet the presence of decay in a lower permanent incisor is far more significant than its occurrence in a first permanent molar.

Similarly, the site of the initial lesion in terms of the topography of a given tooth is important, since the sites of predilection are pits and fissures and contact areas, in that order. Cervical decay is much less common, while decay of the smooth middle third of the labial or lingual surfaces is extremely rare. The following data was therefore obtained in addition to counting the number of DMF teeth:

1. Number of surfaces per tooth attacked by caries.
2. Ratio of the number of carious surfaces to the number of carious teeth per person.
3. Location of the lesion.
4. Degree of caries.
5. Prevalence of decay in first permanent molars.

*Number of DMF Tooth Surfaces Attacked by Caries per Person.**—The number of carious tooth surfaces per child was computed by dividing the total number of carious surfaces by the number of children observed. Although each tooth has five surfaces, a completely carious crown (or extracted tooth) was given a value of three carious surfaces, as suggested by Bodecker (1939). This is valid, since the character of the site of injury is more important than the anatomic location of the surface attacked. In our study, we considered decay as beginning in pits and fissures rather than occlusal decay, proximal (contact area) rather than mesial or distal decay, and cervical decay rather than labial (buccal) or lingual surface decay (Table I). Clinical observations confirmed the desirability of this type of analysis rather than the more commonly used surface designation, although in most cases the two systems are quite similar.

TABLE I. ANALYSIS OF DENTAL CARIES IN 162 NEAPOLITAN CHILDREN AGES 10 TO 18 YEARS

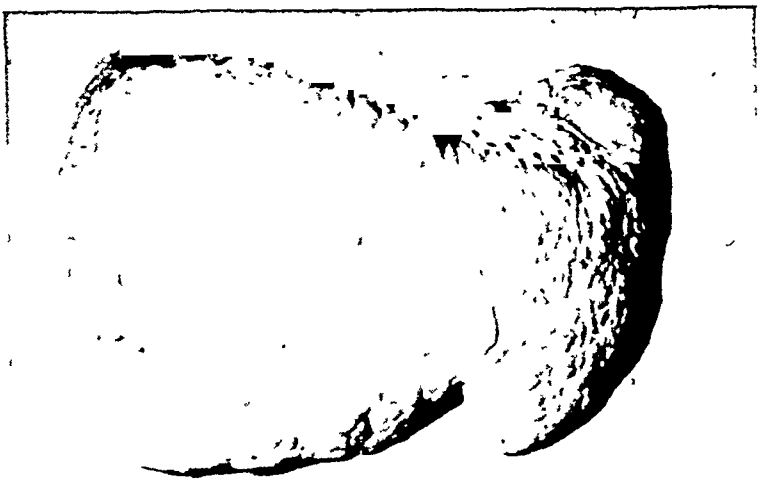
Caries Experience			
DMF permanent teeth per person		1.67	
DMF permanent tooth surfaces per person		2.45	
Caries Rate			
Number children DMF free (0)		57 (35.0%)	
Number children with caries		105 (65.0%)	
		162 (100%)	
Number children with mild caries	(1+)		88 (83.8%)
Number children with moderate caries	(2+)		16 (15.2%)
Number children with severe caries*	(3+)		1 (1.0%)
			105 (100%)
Caries Topography			
Pit and fissure decay (occlusal)		234 surfaces (58.8%)	
Proximal decay (mesial and distal)		148 surfaces (37.2%)	
Cervical decay (buccal and lingual on enamel)		16 surfaces (4.0%)	
Cemental caries		0 surface (0.0%)	
Total number carious surfaces		398 (100%)	

*Severe caries occurred in 46 first permanent molars. These were evaluated as 3 carious surfaces, one pit and fissure and 2 proximal carious surfaces, on the basis of clinical observations.

*Carious tooth surface or tooth surface attacked by caries is defined as one exhibiting active decay, filled, or missing because of caries.

The cause of death was the extensive destruction of functional liver tissue with its resultant, widespread, systemic effects. The changes in the lungs can be considered terminal events, secondary to the liver disease, but contributing factors in the death of the patient. The impression gained was that of a very active (as indicated by the extensive necrosis within the nodules of regenerating liver tissue) and virulent hepatitis, leading to cirrhosis.

Fig. 1.



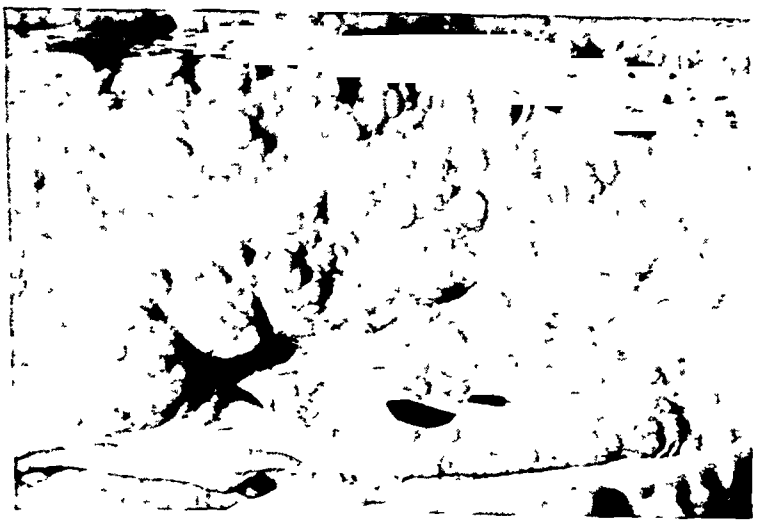


Fig. 2.

Fig. 1.—Gross appearance of liver.
Fig. 2.—Gross appearance of capsular and cut surfaces of liver.

COMMENT

Terminology.—The classification and terminology of the various types of liver cirrhosis are still far from being satisfactory. Complaints are many that the present terminology is more confusing than helpful (Moon,[1] Levy,[2] Evans[3]).

TABLE II. COMPARISON OF CARIES EXPERIENCE IN 162 CHILDREN 10 TO 18 YEARS OF AGE OF NAPLES, ITALY, AND OF HAGERSTOWN, MD.

CARIES EXPERIENCE	NAPLES	HAGERSTOWN*
Per cent Children caries free	35.0	8.5
Per cent Children with caries	65.0	91.5
DMF permanent teeth per person	1.67	5.5
DMF permanent tooth surfaces per person	2.45	11.3
Ratio of DMF surfaces to DMF teeth	1.46	2.05

*Averages of detailed data presented by Klein and Palmer, 1941.

tacks the entire dentition (including the lower incisors) and which is not uncommon in the United States (Massler, 1945) occurred in this group in only one case.

Sites of Predilection.—As was expected, more than half of the carious lesions began in occlusal pits and fissures and progressed at a slow rate (Table I).

First Permanent Molars.—The first permanent molars, which have the longest exposure to the risk of caries attack in point of time and have the highest susceptibility because of the presence of pits and fissures, are, therefore, most commonly attacked by caries (morbidity) and most frequently lost by extraction (mortality). This tooth also suffered the greatest injury in this group (Table III). The four first molars alone account for 74 per cent of the DMF teeth and 78 per cent of the DMF tooth surfaces (Table III).

TABLE III. DISTRIBUTION OF CARIES IN DIFFERENT CLASSES OF TEETH AMONG 162 NEAPOLITAN CHILDREN (10-18 YEARS OF AGE)

CLASSES OF TEETH	DMF CARIOUS TEETH	DMF CARIOUS SURFACES
Number in:		
Upper incisors	15 (5.6%)	19 (4.7%)
Upper and lower bicuspids	19 (7.0%)	26 (6.5%)
Upper and lower second permanent molars	35 (13.0%)	43 (10.8%)
Upper and lower first permanent molars	201 (74.4%)	310 (77.8%)
Total Number	270 (100 %)	398 (100 %)
Lower first permanent molars	136 (50.4%)	204 (51.2%)
Upper first permanent molars	65 (24.0%)	106 (26.6%)

The two *lower* first permanent molars alone accounted for 50.4 per cent of the DMF teeth and 51.2 per cent of the DMF surfaces, while the upper first permanent molars contributed about half of this amount (24.0 per cent of DMF teeth; 26.6 per cent of DMF surfaces).

The distribution of caries in different classes of permanent teeth in our group was similar to but not identical with that reported by Knutson, Klein and Palmer (1938) and by Klein and Palmer (1938). This is due to the fact that the distribution of caries among the different classes of teeth varies considerably with each year of age and the age groupings in the two studies differ slightly. Our group actually covered eight chronological years.

Of all the first permanent molars, 69 per cent were caries-free; thus, only 31 per cent were attacked by caries (Table IV). Of these, 21.3 per cent were slow, simple decay (confined primarily to occlusal pits and fissures). Only 2.7 per cent showed a moderate amount of decay with large lesions, while 7 per cent of the molars were decayed to a point where practically the entire crown was destroyed.

cludes expressions like "hypertrophic" (for biliary) cirrhosis, or "atrophic" (for portal) cirrhosis, unsuitable for pediatric use, since, due to the notoriously fast course of the disease in children, many will die before the liver has had time to become atrophic. Actually, at necropsy, the liver will frequently be found to be hypertrophic in cases of so-called "atrophic," that is, portal cirrhosis, because of marked parenchymatous regeneration.

Etiologic designations, as for instance "alcoholic" (an unfortunate synonym for portal) cirrhosis should not enter into the terminology, until the cause of the disease is known.

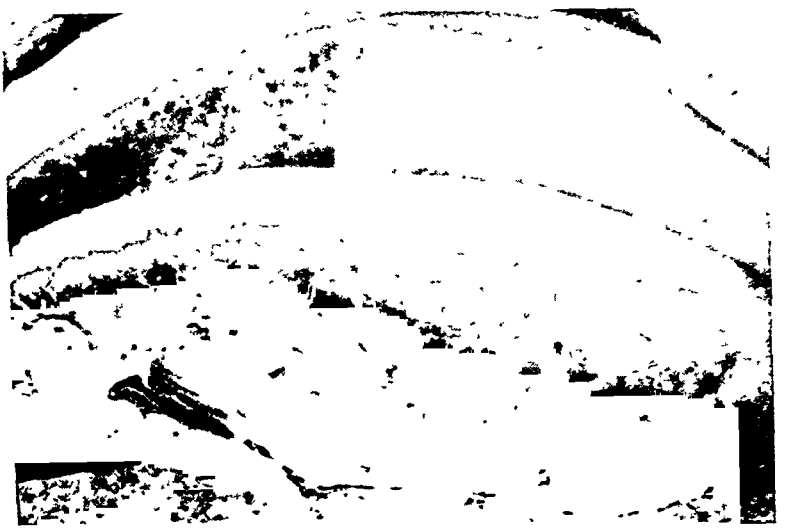


Fig. 5.—Gross appearance of capsular and cut surfaces of spleen.

Pathogenesis.—Recent studies have shown that nutrition may play an important part in the production of cirrhosis. In the case of this very well-nourished boy, we feel sure that dietary insufficiencies were not responsible for his disease.

Infection has been widely discussed as one of the most important causes of cirrhosis. This may be either of spirochetal, bacterial, or virus type.

Cirrhosis due to congenital syphilis could be ruled out in this case. Although positive during life, the Kolmer test was negative with post-mortem blood. There was no history of any syphilitic symptoms, no syphilitic stigmata were found, and all members of the patient's family (parents and siblings) showed negative serologic reactions for syphilis.

The histologic picture of liver sections was not that found in cases of syphilis. Furthermore, cirrhosis due to congenital syphilis would be a most unusual occurrence in an 11-year-old child.

Bacterial infections have been described among others by Moon,[4] who, in 1927, reported two cases of cirrhosis (that of a girl 12 years old and of a boy 14 years old) in whom streptococci were demonstrated in the liver and

DISCUSSION

The teen-age child is characterized by increased nutritional needs and dental defects. In the United States the rate of caries progress is most rapid, and rampant caries finds its highest incidence during this age period (Massler, 1945).

The teen-age children of Naples showed decided retardation in both growth (understature and underweight) and development (menarche), pallor, fatigue, and specific nutritional deficiencies (Kyhos). The food intake was low in quantity and deficient in quality, only 50 per cent of the required protein and calories being available (Flumerfelt). In spite of these factors, the caries experience was very much lower than in teen-age children in the United States. These findings seem to contradict the generally accepted thesis that good nutrition will prevent or arrest the progress of decay.

Caries and Malnutrition.—The relation between malnutrition and a low caries experience has been pointed out in other population groups. There is sufficient evidence to suggest that the incidence of caries is *not* increased in areas of lowered nutrition, subnutrition or even in malnutrition. Friel (1922) examined the children in Vienna after the First World War and found evidence of a low incidence of caries in both the deciduous and permanent dentitions. These children averaged about 14 lb. underweight and were correspondingly understatured. Rickets, anemia, and tuberculosis were very common.

Day (1944) examined the teeth of persons in the Kangra District of Northern India where the diets are deficient in calcium, phosphorus, fat, fat-soluble vitamins and vitamin C. A great percentage of the population suffer from rickets and osteomalacia. He found a remarkably low prevalence of dental decay in these people. Children with clinical rickets showed a caries prevalence of only 1.4 cavities per child. Of women suffering from osteomalacia associated with frequent pregnancies, 36 per cent were caries free. There was an average of only 1.5 cavities per person. In 200 teen-age boys, the caries experience was 1.56 cavities per boy. Day points out that there is almost a complete absence of refined sugar in the diet.

Cady (1946) points out the relatively low incidence of caries in malnourished Dutch children residing in Coventry, England. Reports from England (Oliver, 1946), Norway (Collett, 1946), and other areas where nutritional standards have been lowered during the war years, confirm the finding that caries incidence is lowered. Nearly all reports stress the factor of a lowered refined sugar intake.

Repatriated American prisoners of war from the Far East suffering from malnutrition also show fewer carious teeth than healthy and well-nourished persons (Morgan and associates, 1946).

In this country, Dreizen and associates (1946) and Mann and associates (1947) indicate that the caries prevalence is lower in malnourished patients residing in or near Birmingham than in well-nourished persons.

Caries and Sugar Intake.—In all these studies, the most prominent common factor that might explain the lowered caries prevalence in areas of under-

In our case, such an assumption is not without grounds, for acute necrosis, demonstrable even in newly regenerated liver cells, was taking place up to the time of death, indicating an active process. The early symptoms and clinical course of this patient also would well fit the picture of infectious hepatitis. The final answer to the question whether portal cirrhosis can be caused by infectious hepatitis, must of course, come from pathologists. One authoritative statement supporting this assumption has very recently been made by Mallory,[9] who stated, "I feel certain I have seen cirrhosis that could be traced back to hepatitis." Another convincing study is that of two Danish workers, Krarup and Roholm,[10] who reported on pathologic specimens obtained by aspiration biopsies of the livers of twelve patients with "acute or epidemic hepatitis." They demonstrated, by histologic examination, "all sorts of transitions" between acute hepatitis and fully developed cirrhosis and postulate a "nosological unity" of acute hepatitis and cirrhosis of the liver.

Familial Incidence.—This was demonstrated by a number of authors, among them Weber,[11] who has an interesting concept of this familial tendency to develop cirrhosis. He explains familial hepatic cirrhosis as an inborn, constitutional defect in the hepatic cells which diminishes their power of resistance to toxins or causes them to decay prematurely. To this defect, he gave the name of "dysbiotrophy" of tissue, and classified the disease under the "congenital-developmental class of diseases," a group in which he includes such diseases as hemophilia, familial hemolytic icterus, lipodystrophies, glycogen storage disease, and others, including allergic peculiarities.

More recently, Bridgeman[12] and Yater[13] reported instances of familial cirrhosis. In our case, no familial tendency could be demonstrated. Laboratory tests were performed with the blood of the patient's parents and siblings, but no indication of liver disease was found (Table II).

TABLE II. SEROLOGIC REACTIONS AND LIVER FUNCTION TESTS ON PARENTS AND THREE SIBLINGS OF PATIENT

	KOLMER TEST	ICTERIC INDEX	CEPHALIN FLOCCULATION TEST	SERUM PROTEINS (GM. PER 100 C.C.)		
				TOTAL	ALBUMIN	GLOBULIN
Father, 53 years	Neg.	4	Neg.	6.5	3.5	3.0
Mother, 47 years	Neg.	6	Neg.	6.9	3.4	3.5
Brother, 27 years	Neg.	–	–	6.6	3.8	2.8
Brother, 23 years	Neg.	3	Neg.	6.2	4.1	2.1
Sister, 16 years	Neg.	2	Neg.	6.1	3.4	2.7
Sister, 15 years	Neg.	2	Neg.	6.6	3.8	2.8

Diagnosis.—Preoperatively, this patient presented some interesting diagnostic problems.

The fast course of the illness, the presence of fever, and pleural effusion, may make one not familiar with this rather uncommon condition in children think first of possibilities other than liver cirrhosis.

Adhesive pericarditis with cirrhosis and polyserositis was considered in this case, but could be excluded by the absence of any history of previous cardiac difficulties as well as by the negative roentgenologic report.

American children. This latter study might lead to the conclusion that genetic factors are less important in the caries problem than is the character of the diet.

Fluorides.—The influence of fluorine as a factor in the low DMF experience can be eliminated here, since systemic mottled enamel was not seen and the water supply of Naples contained no significant amount of fluorine (0.2 parts per million).

Caries Susceptibility of Different Classes of Teeth.—Table III shows the distribution of caries among the incisors, bicuspids, and molars.

Anatomical Considerations.—Anatomical factors which are conducive to different degrees of stagnation or self-cleansing can explain some of the differences in susceptibility. In any given tooth, therefore, the pits and fissures are more susceptible to decay than are the smooth surfaces. Those smooth surfaces which may accumulate debris (contact areas, cervical areas) are more susceptible than self-cleansing areas (cuspal areas, occlusal two-thirds of buccal and lingual areas). These anatomic factors also account for the greater predilection of the posterior teeth (which have pits and fissures) to decay, than of the incisors, which are free of occlusal pits and fissures (Klein and Palmer, 1941).

Caries and Saliva.—However, when one compares the susceptibility of teeth with the *same* general anatomic characteristics, in the upper and in the lower jaws, a distinct difference in susceptibility is noted in the different arches. The lower molars are more susceptible to decay than are the upper molars, while the upper incisors are more susceptible than the lower incisors. The differences in caries susceptibility are considerable and significant and cannot be accounted for on an anatomic basis. One possible correlation that suggests itself is the fact that the salivary gland openings are located near the lower anterior teeth and near the upper posterior teeth. Both of these areas are significantly less susceptible to decay than the corresponding areas in the opposite jaw which are less apt to be bathed by saliva. Whether this is due to the detergent action of the saliva or to some bacteriostatic factor in the saliva remains to be determined.

The rare occurrence of caries on the palatal and lingual surfaces of the teeth may similarly be explained in part by their ready contact with saliva, aided by the mechanical action of the tongue. The labial and buccal surfaces, in contrast, are much more liable to cervical decay than the palatal and lingual surfaces since the saliva is displaced from the vestibule by the action of the lips and cheeks.

SUMMARY AND CONCLUSIONS

One hundred and sixty-two children, ages 10 to 18 years, living in Naples, were examined for dental defects in 1945-1946. The prevalence of caries experience was 1.67 DMF permanent teeth and 2.45 DMF permanent tooth surfaces per child. This is very low in comparison with that reported for similar age groups in the United States. Of the children, 35 per cent were caries free. Of the 65 per cent that suffered from dental decay, 83.8 per cent showed only the initial stages of caries which progressed slowly: 69 per cent of the first permanent molars were caries free

These patients are benefited by splenectomy, and for them the term *splenomegalic anemia*, in preference to "Banti's disease," might be clinically helpful.

Without surgical exploration it is generally impossible to differentiate the two diagnoses, as this patient again demonstrates. That the spleen was not palpable in this case may have been due to the presence of marked ascites, since actually the spleen was found to have been considerably enlarged. The fast course of the disease would speak against the so-called "third stage of Banti's disease" although it might be argued that the boy may have had an enlarged spleen long before the onset of subjective symptoms.

In retrospect, the symptoms and signs in this case were fairly typical for juvenile cirrhosis, including the originally somewhat baffling occurrence of fever, pleural effusion, and the fast course of illness. All three findings have been mentioned frequently in the literature on this subject. (Moon,[1] Curtiss,[20] Kelly,[21] Asselstine,[22] Ratnoff.[23])

Laboratory Findings.—Analysis of the laboratory studies revealed that they were compatible with a diagnosis of severe liver damage. Occasional traces of sugar in the urine are not infrequently found in patients with liver disease. Mild leucocytosis is the usual finding in cirrhosis of the liver. Prolonged prothrombin time also pointed to liver damage. The thrombocytopenia may be interpreted as toxic depression of the bone marrow, although there was a vigorous attempt at blood cell regeneration, as indicated by the relatively high reticulocyte count of 5.3 per cent.

Since the liver is the main site of esterification of cholesterol, the low value obtained for cholesterol-esters also indicated liver damage, as did the serum albumin value of 1.4 Gm. per cent.

The finding of *E. coli* in the fluid obtained from the peritoneal cavity is not fully understood, although the presence of this organism in the sections of the leiomyoma found on the cecum, may be an explanation.

The serologic tests performed on the patient's family were done because of the very unusual reactions obtained with the patient's blood. As stated in the case history, the boy's Kolmer, Kline, and Kahn tests all gave 4 plus positive reactions during life, while Kolmer and Kline tests gave negative reactions with post-mortem blood. This is the more surprising since bilirubinemia, which may explain falsely positive reactions, was more pronounced post mortem (25.6 mg. per cent) than during life (6.5 mg. per cent). Although the number of pathologic conditions in which falsely positive serologic reactions can be obtained is rising constantly, a 4 plus positive reaction with all three tests is rather unusual. We are at a loss to explain this finding.

Finally, an observation is worth mentioning which would add another case to the number of patients with liver cirrhosis in whom disturbances of the endocrine system have been found. Zondek advanced the theory that the liver inactivates sex hormones and there is ample experimental proof of that. Glass and co-workers[24] studied fourteen male patients with cirrhosis and found gynecomastia in eight of them and testicular atrophy in all of them. Assay of urine specimens for androgens and estrogens revealed low values for the former, but the presence of practically all of the estrogens in free form. These

RABIES

A Case Report with Notes on the Isolation of the Virus from Saliva

Carl E. Duffy, Ph.D., Paul V. Woolley, Jr., M.D., and
Wilfred S. Nolting, M.D.

With the Technical Assistance of

Norma H. Feeley
Detroit, Mich.

ACCURATE clinical accounts of rabies in childhood have been recorded so frequently in medical literature that it would appear nothing new could be gained through further case reports. However, a recent incident illustrated how confusing the diagnosis can be when a clear-cut history of exposure is not obtained, and also provided an opportunity for some rather unique and practical laboratory observations.

The patient, a 13-month-old boy, was brought to the hospital because of fever, refusal of food, irritability, restlessness, and disorientation, all of twenty-four hours' duration. He had been well previously and had developed in a manner befitting his chronologic age. The only unusual event was an injury sustained some five weeks earlier when he supposedly had fallen upon a toy while playing in his pen. This had resulted in an irregular laceration on the upper lip which had necessitated the placing of several sutures by the attending physician. At the time of admission the wound had healed, leaving a reddened, nonindurated scar.

Examination showed the child to be overactive, apprehensive to the point of clinging constantly to the examiner, and completely divorced from his surroundings. His hands moved constantly in a purposeless manner and he would neither sit nor stand. There was no stiffness of the back or neck and the reflexes were not noted to be abnormal. His pupils reacted to light, although one was seen to be slightly larger than the other. The fundi were easily visualized and appeared intact. There was no impairment of hearing, swallowing, or vocalization. The rectal temperature was 103° F., blood pressure 120/80, pulse 100 per minute, and nothing out of the ordinary was found during the remainder of the examination.

Laboratory data at the time of admission included a normal urine, hemoglobin of 12 Gm. per 100 c.c. of blood, 7,200 white cells per cubic millimeter with 40 per cent polymorphonuclear leucocytes, 58 per cent lymphocytes, and 2 per cent monocytes. The Mazzini test was negative, as was also the reaction to a 1:100 dilution of tuberculin. Cerebrospinal fluid, obtained under pressure

From the Virus Laboratories of The Children's Fund of Michigan, The Children's Hospital of Michigan, and the Departments of Bacteriology and Pediatrics, Wayne University College of Medicine.

DENTAL CARIES EXPERIENCE IN POSTWAR ITALY (1945)

II. Among Teen-Age Children in Naples

Maury Massler, D.D.S., M.S.,* and Isaac Schour, D.D.S., Ph.D.†
Chicago, Ill.

INTRODUCTION

FOLLOWING an extensive study of the prevalence of dental decay in four cities of postwar Italy (Schour and Massler, 1947), a more intensive dental study was made of 162 Neapolitan children 10 to 18 years of age. These children showed decided retardation in both growth (understature and undergroup studied in Naples, and they were subjected to a more detailed medical and dental investigation.

Nutritional Status of Teen-Age Neapolitan Children in 1945.—These children were selected on the basis of their age alone from the more general age weight) and development (menarche); pallor, fatigue, and clinical signs of some specific nutritional deficiencies, particularly vitamin A and vitamin B complex (thiamin, riboflavin and niacin) (Kyhos). The food intake was low in quantity and deficient in quality, approximately 50 per cent of the required proteins and calories being available (Flumerfelt).

METHOD OF EXAMINATION

Examination of the oral cavity was made with special care, in a dental chair, using a mouth mirror and explorer under excellent lighting conditions. All teeth were recorded by a well-trained assistant.

Carious surfaces were noted as well as restorations and missing teeth.

Caries Prevalence, Decayed, Missing, or Filled (DMF) Teeth per Person.—Caries experience was recorded by summing up the total number of permanent teeth which were decayed (D), missing because of caries (M), or filled (F). Since extractions and fillings were rarely observed in this group, the caries experience is concerned almost entirely with decayed teeth.

In contrast to the extensive survey, where only the number of DMF teeth per person was computed, additional criteria for the assessment of dental decay were used in this study, since there are a number of limitations to an analysis of dental decay which is confined simply to counting the number of decayed teeth. Such a number does not give a complete picture of the carious processes. It disregards the site and extent of the lesion and the tooth affected. It may even be misleading, since an equal weight is given to a carious cavity in the first permanent molar, which is very commonly affected by decay, and to a

*Associate Professor of Pedodontics, University of Illinois College of Dentistry.
†Professor and Head of Department of Histology, University of Illinois College of Dentistry.

This study was conducted under the auspices of the Italian Medical Nutrition Mission. Grateful acknowledgment is given to the Unitarian Service Committee, the Congregational-Christian Service Committee and the UNRRA for providing the necessary facilities for this investigation.

This paper is the second in a series dealing with the prevalence of dental caries in sub-nutrition and malnutrition groups in postwar Italy.

was noted rarely and only during the periods of spasm while no true dysphagia was encountered. Occasionally the pulse appeared extremely rapid and for brief periods abdominal distension was troublesome. Despite sponging and antipyretics the temperature fluctuated only rarely from 103° F. As the child remained essentially unchanged day after day, the diagnosis of rabies was entertained less seriously, especially when a re-examination of the cerebrospinal fluid on the eighth day of the disease showed 110 cells, of which 90 per cent were mononuclear, and 93 mg. of protein per 100 c.c. The sugar and chloride determinations on the same specimen were within normal range. Encephalitis due to agents other than rabies, a bizarre form of tuberculous meningitis, or even a diffuse medulloblastoma were again considered. However, on the following day, the tenth of symptoms and the ninth of hospitalization, he was considerably weaker and peripheral vascular collapse seemed imminent, although he appeared much more alert and would focus on objects for short periods of time. During the night he experienced the first true difficulty with swallowing and early in the morning expired apparently while sleeping quietly. Permission for an autopsy was denied, so that our impression could not be extended beyond encephalitis of unknown etiology.

LABORATORY STUDIES

On the fourth day after the development of symptoms and seven days before the infant expired, samples of spinal fluid, blood, and saliva were obtained.

The spinal fluid was immediately injected into ten 3- to 4-week-old Swiss mice. All received 0.03 c.c. intracerebrally and seven of the ten received, in addition 0.4 c.c. intraperitoneally. The mice were observed daily for sixty-six days and remained well throughout the observation period.

The blood was allowed to clot and was then stored at 4° C. to 6° C. for approximately forty-eight hours. It was then contrifuged and the serum removed. The serum was transferred to a 10 c.c. screw-cap bottle and stored in a dry-ice cabinet. After twenty-nine days' storage in the dry-ice cabinet, the serum was removed and thawed in a water-bath at 37° C. The serum was then inoculated intracerebrally into Swiss mice. Each of eight mice were injected intracerebrally with 0.03 c.c. of the serum. These eight mice remained well throughout the observation period of sixty days.

The saliva was obtained while the child was under paraldehyde sedation. The head was turned to one side and the saliva was aspirated with a medicine dropper as it collected on the inner surface of the cheek and under the tongue. Approximately five minutes were spent in collecting about 0.8 c.c. of saliva. The saliva was immediately taken to the laboratory and injected into 3- to 4-week-old Swiss mice. Each of eight mice were injected intracerebrally with 0.03 c.c. of untreated saliva. To 0.5 c.c. of the saliva, 1,000 units of penicillin were added. After mixing the saliva and penicillin 0.03 c.c. of the mixture was injected intracerebrally into each of seven mice. Two additional mice were injected intraperitoneally with 0.1 c.c. of the penicillin-treated saliva. The results appear in Table I. All of the mice which were injected with the untreated saliva died within twenty-four hours. Gram stains of impressions of the

Ratio of Carious Surfaces to Carious Teeth.—This ratio gives some idea of the number of surfaces attacked per carious tooth (Boyd and Cheyne, 1946).

Location of the Lesion.—Each lesion in each tooth was characterized as being pit and fissure decay (occlusal), proximal decay (mesial or distal), cervical decay (buccal or lingual surfaces on enamel) or cemental caries. Buccal pit decay in molars and lingual pit decay in the upper incisors were recorded separately but were uncommon.

Degree of Caries.—An estimation of the degree of decay (mild, moderate, or severe) was made for the entire dentition in each child, taking into consideration the following factors: (a) the class of teeth affected; (b) the extent and depth of the carious cavities; (c) the posteruptive age of the teeth affected.

Mild: Small lesions confined to teeth of highest caries susceptibility (the first and second molars).

Moderate: Extensive and destructive lesions in molars and/or small lesions in teeth of intermediate caries susceptibility (bicuspids and upper incisors).

Severe: Destructive lesions in molars and bicuspids and/or caries present in teeth of least susceptibility (cuspids and lower incisors).

Other things being equal, the degree of caries was considered to be more advanced in proportion to the shorter posteruptive life of the teeth involved. Similarly, while the limitation of caries to the molars would tend to the designation of mild decay, the presence of deep caries and the subsequent destruction of the crown in more than two molars would lead to the designation of moderate. Furthermore, caries was designated as being severe even if only the molars were affected, provided the destruction of the crowns occurred at an early posteruptive age of these teeth, as in a 7-year-old child.

FINDINGS

Number of DMF Teeth and Decayed Surfaces per Person.—Of 162 teenage Neapolitan children, there was an average of 1.67 DMF permanent teeth and 2.45 DMF permanent tooth surfaces (Table I). The ratio of carious surfaces to carious teeth was 1.46 carious surfaces per DMF tooth. This is low in comparison with findings in comparable groups in Hagerstown, Md., where approximately 5.5 DMF permanent teeth and 11.3 decayed permanent tooth surfaces per person or 2.05 DMF surfaces per DMF tooth per person was found (Klein and Palmer, 1941).

Per Cent of Children With No DMF Teeth.—Of the children, 35 per cent were caries-free. This was unusually high, since the average per cent of caries-free children of ages 10 to 18 in Hagerstown was approximately 8.5 per cent, according to Klein and Palmer (1941) (Table II).

Degree of Caries.—When caries did occur (in 65 per cent of the children) it was usually mild (in 83.8 per cent of the children with caries) and did not extend over more than half of the surface of the tooth attacked (Table I). A percentage of 87.4 of all the carious teeth were molar teeth, while 88.6 per cent of all the carious surfaces were confined to the first and second molars (Table III). The extensive and deeply penetrating type of decay which rapidly at-

The two mice which were injected intraperitoneally with the penicillin-treated saliva remained well throughout the sixty-six day observation period.

The demonstration of Negri bodies in the brain of man and other animals is accepted as sufficient evidence to make a diagnosis of rabies. However, in the present study it seemed that the agent isolated should be further identified particularly since it was recovered from an extraneural source. Therefore, a neutralization test was performed to determine whether hyperimmune rabies antiserum* would neutralize the virus. Simultaneously, the serum of the infant, obtained four days after the onset of symptoms, was tested against the agent isolated from the saliva to determine whether it contained neutralizing antibodies. A 20 per cent suspension of mouse brain infected with the agent isolated from the saliva was prepared by grinding the brain in a mortar with sand and a mixture composed of 10 per cent rabbit serum and saline. Further tenfold dilutions of the 20 per cent brain suspension were prepared using 10 per cent rabbit serum-saline as a diluent. The dilutions of virus to be tested were added, in 0.2 c.c. amounts, to Kahn tubes containing 0.2 c.c. of the serum to be tested. The tubes containing serum were kept in an ice water bath while the virus was being added. Following the addition of the virus, the serum-virus mixtures were incubated in a water bath at 37° C. for two hours. The tubes containing the serum-virus mixtures were then placed in an ice water bath and the mixtures were then immediately injected intracerebrally into mice. Normal rabbit serum was used as a control. The results appear in Table II. It will be observed that the agent isolated was neutralized by the rabies hyperimmune serum, thus confirming the evidence obtained by histologic studies. The serum of the infant contained little or no antibody since the LD/50 titer[1] of the agent mixed with the infant's serum was about the same as that obtained when the virus was mixed with normal rabbit serum.

TABLE II. SEROLOGICAL IDENTIFICATION OF THE VIRUS

SERUM TESTED	DILUTIONS OF VIRUS							LD/50 TITER NEGATIVE LOG. OF DILUTION	NEUTRALIZATION INDEX*
	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}		
Normal rabbit serum (control)	—	4/4†	3/4	2/5	0/5	0/5	0/5	3.7	—
Patient's serum	5/5	5/5	3/4	0/4	0/5	—	—	3.3	3
Hyperimmune rabies antiserum	1/5	0/4	0/5	0/5	0/4	—	—	0.6‡	>1260

*Neutralization index = antilog $\frac{\text{LD/50 titer of virus mixed with normal rabbit serum}}{\text{LD/50 titer of virus mixed with serum being tested}}$

†Denominator denotes number of mice tested and the numerator denotes the number of deaths.

‡No LD/50 end-point was obtained. This figure was obtained by assuming that if a tenfold lower dilution of the virus were tested all the animals would have died.

DISCUSSION

The diagnosis of rabies is so intimately connected with a history of animal bite that the present case proved a revelation to us since, in the absence of a

*The hyperimmune rabies antiserum was obtained through the courtesy of Dr. F. D. Stimpert of Parke, Davis and Company.

Since the depth and extent of cavitation increases with time, the post-eruptive age of the tooth carrying the lesion should be taken into consideration (Klein and Palmer, 1941). It was noted that the larger sized lesions and the extensive decay which occurred in 9.7 per cent of the first permanent molars were found only in the older aged children. This would indicate that when caries did attack the tooth it was a slow process and it took a long time for the cavity to increase in extent and depth.

Analysis of the distribution of the sites affected by caries shows a remarkable similarity between the distribution in the first permanent molars and in the mouth as a whole, that is, 60 per cent of all caries begin in pits and fissures, 36 per cent in proximal surfaces and 4 per cent on cervical areas (buccal and lingual). (Compare Tables I and IV.) This is not surprising, since the first permanent molars contributed almost 78 per cent of the total number of DMF surfaces.

Comparison of the caries experience in the first permanent molars of Neapolitan with Hagerstown children re-emphasizes the fact that the number of teeth attacked by caries was much lower and the progress of the lesion was much slower in the Italian children than in 14-year-old Hagerstown girls (Table V). The first permanent molar morbidity and mortality in the Italian children was approximately one-half that of Hagerstown 14-year-old girls. In Hagerstown almost three of the four first permanent molars were carious, while in Naples one and one-quarter of the four molars were affected. In Hagerstown, twenty out of every 100 molars were lost by caries; in Naples, only 7 per cent were missing.

TABLE IV. ANALYSIS OF DENTAL CARIES EXPERIENCE IN FIRST PERMANENT MOLARS IN 162 TEEN-AGE NEAPOLITAN CHILDREN

Total number first permanent molars		648	
No. teeth caries free		447	(69.0%)
No. teeth with caries		201	(31.0%)
Number with mild decay	(1+)	138	(21.3%)
Number with moderate decay	(2+)	17	(2.7%)
Number with severe decay (Extractions Indicated)*	(3+)	46	(7.0%)
Total number first permanent molars		648	(100 %)
Total number surfaces affected by caries		310	
Pit and fissure decay (occlusal)		186	(60.0%)
Proximal decay (mesial and distal)		110	(35.5%)
Cervical decay (buccal and lingual)		14	(4.5%)
Total number carious surfaces*		310	(100 %)

*Evaluated as 3 carious surfaces; 1 pit and fissure, and 2 proximal carious surfaces, on the basis of clinical observations.

TABLE V. COMPARISON OF CARIES PREVALENCE IN FIRST PERMANENT MOLARS IN TEEN-AGE CHILDREN OF NAPLES, ITALY AND HAGERSTOWN, MD.

	NAPLES	HAGERSTOWN*
Total number first permanent molars per person	4.0	4.0
Number first permanent molars caries free (per person)	2.76 (69%)	1.11 (28 %)
Number first permanent molars with caries (per person)	1.24 (31%)	2.89 (72 %)
Mortality of first permanent molars (per person)	0.28 (7%)	0.52 (20.5%)

*From data presented by Knutson, Klein and Palmer (J. A. D. A., 1938) for 14-year-old girls.

in order to minimize the chances of causing a bacterial infection in the mice. Sulkin and Harford[7] isolated rabies virus from saliva which had been treated with ether and in the present study virus was isolated from saliva to which penicillin was added. Perhaps in future attempts to isolate rabies virus from the saliva of man a portion of the saliva should be treated with ether and another with penicillin or other bacteriostatic agents before inoculation into mice.

The finding of the virus of rabies in the saliva of man indicates that the disease may be transmitted through the bite of a rabid individual. Koch[10] has referred to two cases in which rabies was transmitted from one person to another. In one instance the disease may have been contracted during coitus and in another the disease developed following the bite of a rabid individual. The diagnosis in these two cases, however, is not unequivocal, particularly since they occurred prior to Negri's[11] demonstration of the association of intracytoplasmic inclusion bodies in the nerve cells with rabies. Kraus, Gerlach, and Schweinburg[12] have pointed out the discordance in the results and opinions concerning infectivity of saliva and added that no case of rabies has been known to be produced by the bite of a human being. However, as Sulkin and Harford[7] have pointed out, those who are in close contact with rabid individuals should take due precautions to prevent the saliva from entering wounds and abrasions.

One other point should be discussed at this time. Sulkin and Harford[7] obtained the saliva, from which they isolated rabies virus, from the patient during a convulsive seizure at a time when there was a copious flow of saliva. On the other hand, they failed to recover the virus from another case in which saliva was obtained by swabbing the mouth. From these findings Sulkin and Harford suggested that only a copious flow of saliva may contain sufficinet virus to be detected. That this is not necessarily true is apparent from the case reported here. The saliva was obtained at a time when the infant was under paraldehyde sedation and when there were no muscular twitchings or trismus. The saliva was not abundant since considerable time was spent in obtaining a sufficient quantity for animal inoculation.

SUMMARY

1. The history of an infant with a clinically undiagnosed disease of the central nervous system is recorded. While the possibility of a dog bite was recognized, nothing specific of rabies was descernible.

2. The diagnosis of rabies was established by isolating rabies virus from the saliva.

3. The untreated saliva when injected intracerebrally into mice, killed the animals within twenty-four hours.

4. The same saliva when mixed with penicillin and inoculated intracerebrally, permitted three of the seven mice inoculated to survive long enough so that the virus could be recovered.

5. The agent isolated from the saliva was shown to be rabies virus by demonstrating Negri bodies in the brains of mice and by neutralizing tests.

6. The virus was not isolated from the cerebrospinal fluid or blood.

nutrition and malnutrition is the marked decrease in refined sugar intake. The lowered prevalence of caries that follows a decrease in refined sugar intake seems to occur whether or not the other nutritional elements, including starches, are increased or decreased. The fact that refined sugar intake was always low in Italy and has been markedly decreased during the war, must, therefore, be given careful consideration and may well account for the low caries prevalence in spite of lowered nutritional levels and in spite of a very high starch intake. The per capita consumption of refined sugar per year in the prewar years of 1930-1934 was 18 lb. in Italy, as compared to 103 lb. in the United States (Intern. Inst. Agriculture, '36, cited from McCollum, Orent and Day, 1939, p. 616).

It is well established (Jay, 1940, 1944) that a reduction in carbohydrate intake will lower the incidence of caries (and possibly even arrest its progress). Although the Italian diet is predominantly carbohydrate in character, pasta (spaghetti, macaroni, etc.) and bread forming the major portion of their intake, the refined sugar intake is very low. Our findings thus seem to confirm the contention of Jay (1940), Schweigert and associates (1946) and others that people may eat freely of starchy foods and yet remain relatively free from caries provided *the intake of refined sugar is low.*

Unfortunately, *Lactobacillus acidophilus* counts of the saliva could not be made because of the lack of supplies.

Caries and Vitamin B Deficiency.—Another important factor that should be considered is that the children of Naples exhibited frank clinical signs of vitamin B deficiency. There are a number of reports which stress the relation between a low caries experience and vitamin B deficiency states. Dreizen and associates (1946) point out that both nicotinic acid and thiamine are necessary for the complete degradation of carbohydrates to acid end products. Their absence might serve to inhibit acid production in the mouth and therefore also inhibit caries. Mann and associates (1947) found a lowered caries prevalence in malnourished patients, many of whom showed prominent clinical signs of nicotinic acid and thiamine deficiencies.

The majority of the persons examined in Italy showed clinical signs of vitamin B deficiency. The reason for a very high incidence of clinical signs indicating vitamin B deficiency might be explained in part by the high carbohydrate diet. The latter diet requires more than average amounts of vitamin B complex for its metabolism. A slight deficiency in vitamin B intake would thus be aggravated by the high carbohydrate intake and result in more prominent clinical signs associated with vitamin B complex deficiency than would otherwise be the case.

Genetic Factors.—The importance of genetic factors in caries experience has been pointed out by Hunt and associates (1944) and Klein (1946). However, Day and Sedwick (1935) examined the teeth of 500 children 13 years of age of Italian descent living in Rochester, N. Y., whose diet, presumably, was now Americanized and high in refined sugar, and found no great difference between the incidence of caries in these children and the incidence in

THE PRIMARY ETIOLOGY OF THE SPECIFIC LANGUAGE DISABILITIES

RICHARD S. EUSTIS, M.D.
BOSTON, MASS.

MANY a healthy and intelligent person has been forced to modify his plans for the future because of defective speech or because he found it impossible to absorb knowledge from books fast enough to keep up with his school or college program. This problem of comparative disability in the use of language is a common one and often serious. It has been studied exhaustively by educators, psychologists, psychiatrists, neurologists, and pediatricians. The resulting literature is voluminous but conflicting. It proposes many theories of causation, none of which has been widely accepted.

The specific* language disabilities consist of specific reading disability, speech defects, such as lisping and stuttering, and motor speech delay.† Most investigators report that two or more are often found in the same individual. Most also find that ambidexterity or left-handedness, and unusual bodily clumsiness, are commonly associated conditions. Others find no relationship. Some report a definite familial incidence, which is vehemently denied by others. Almost the only point of complete agreement is that the picture is commoner in boys than in girls by the ratio of at least 3:1.

The pediatrician, seeking understanding of the problem for himself as well as practical aid for his patients, is left thoroughly bewildered.

The familial incidence of the syndrome has been so strongly denied that it is necessary to go into further detail and give some of the arguments pro and con.

Witty and Kopel,[1] and Blau,[2] have collected and summarized the many statistical reports which seem to refute the influence of heredity on the picture. These reports are based very largely, however, on results obtained by questionnaires. Any physician knows how difficult it is to obtain a trustworthy history of the incidence of common diseases in the family. The staff of the Language Clinic has found it even more difficult, because only the extreme instances of language disability and ambidexterity have been noticed and remembered. It is not uncommon for a parent with obviously defective speech to deny the existence of any such in the family. Therefore, the negative evidence of these reports may be partly, at least, discounted.

On the other hand, the evidence in favor of the familial nature of the syndrome is impressive. Scattered through the literature are very many case reports mentioning the existence of similar disabilities in other members of the

From the Language Clinic, Massachusetts General Hospital.

*Excluded are language disabilities due to injuries, disease, or physical or mental abnormalities.

†So termed to distinguish it from late development of speech due to physical or mental abnormalities.

The prevalence of caries in children of similar ages in the United States is more than twice that observed in Neapolitan children. Since the latter were, for the most part, malnourished, the relation between good nutrition and a protective influence against dental caries is not borne out in this study. The low refined sugar intake in Italy and the high refined sugar consumption in the United States may, in part, explain the difference in the prevalence of caries. The rôle of vitamin B deficiency in depressing the incidence of caries should also be considered.

REFERENCES

Bodecker, C. F.: The Modified Dental Caries Index, J. A. D. A. 26: 1453, 1939.

Boyd, J. D., and Cheyne, V. D.: To What Extent Does Fluorine Ingestion Lessen Tooth Decay? Am. J. Dis. Child. 29: 286, 1946.

Cady, F. C.: Dutch Children in Coventry, Oral Hygiene 36: 246, 1946.

Collett, A.: Nordisk Medicin, June 7, 1946, Cited from Dental Benefits of War, Lancet 251: 129, 1946.

Day, C. D. M.: Nutritional Deficiencies and Dental Caries in Northern India, Brit. Dent. J. 76: 115, 143, 1944.

Day, C. D. M., and Sedwick, H. J.: Studies on the Incidence of Dental Caries, D. Cosmos 77: 442, 1935.

Dreizen, S., Mann, A. W., Cline, J. K., and Spies, T. D.: The Buffer Capacity of Saliva as a Measure of Dental Caries Activity, J. Dent. Res. 25: 213, 1946.

Flumerfelt, R.: Unpublished.

Friel, Sheldon: The Effect of the War Diet on the Teeth and Jaws of the Children of Vienna, Austria, Int. J. Orthod., O. S., and Radiogr. 8: 539, 1922.

Hunt, H. R., Hoppert, C. A., and Erwin, W. G.: Inheritance of Susceptibility to Caries in Albino Rats (Mus Norvegicus), J. Dent. Res. 23: 385, 1944.

Jay, Philip: The Rôle of Sugar in the Etiology of Dental Caries, J. A. D. A. 27: 393, 1940.

Jay, Philip: Nutrition and Dental Caries, N. J. Dent. Soc. J. 15: 20, 1944.

Klein, H.: The Family and Dental Disease: IV. Dental Disease (DMF) Experience in Parents and Offspring, J. A. D. A. 33: 735, 1946.

Klein, H., and Palmer, C. E.: The Dental Problem of Elementary School Children, Milbank Mem. Fund. Quart. 16: 267, 1938.

Klein, H., and Palmer, C. E.: Studies on Dental Caries: XII. Comparison of the Caries Susceptibility of the Various Morphological Types of Permanent Teeth, J. Dent. R. 20: 203, 1941a.

Klein, H., and Palmer, C. E.: On the Epidemiology of Dental Caries: Dental Caries, Univ. of Penn. Press, Philadelphia, pp. 1-25, 1941b.

Knutson, J. W., Klein, H., and Palmer, C. E.: Studies on Dental Caries: VIII. Relative Incidence of Caries in Different Permanent Teeth, J. A. D. A. 25: 1923, 1938.

Kyhos, E.: Unpublished.

Mann, A. W., Dreizen, S., Spies, T. D., and Hunt, F. M.: A Comparison of Dental Caries Activity in Malnourished and Well-Nourished Patients, J. A. D. A. 34: 244, 1947.

Massler, Maury: Teen-Age Caries, J. Dent. Child. 12: 57, 1945.

McCollum, E. V., Orent-Keiles, E., and Day, H. G.: The Newer Knowledge of Nutrition (5th ed.), New York, 1939, The Macmillan Co., p. 616.

Morgan, H. J., Wright, I. S., and von Ravenswaay, A.: Health of Repatriated Prisoners of War from the Far East, J. A. M. A. 130: 995, 1946.

Oliver, D. H.: Some Evidence of Wartime Reduction of Caries Incidence in Children, Brit. Dent. J. 80: 115, 1946.

Schour, I., and Massler, M.: Dental Caries Experience in Postwar Italy: I. Prevalence in Different Age Groups, J. A. D. A. 35: 1, 1947.

Schweigert, B. S., Potts, E., Shaw, J. H., Zepplin, M., and Phillips, P. H.: Dental Caries in the Cotton Rat: VIII. Further Studies on the Dietary Effects of Carbohydrate, Protein and Fat on the Incidence and Extent of Carious Lesions, J. Nutrition 32: 405, 1946.

of two or more. Some individuals show all five. Frequently, only one has been noticed, and one or more of the others are discovered later by questioning, observation, and testing.

One way of attacking the problem is to consider it as a whole, as a syndrome of frequently associated symptoms, instead of treating each aspect as a separate entity. When this is done, it becomes obvious that they all, because of their frequent association in the individual and in his family tree, must develop from some common and underlying cause. This much has been suggested by West[5] and a possible underlying cause for infantilisms, stuttering, and motor speech delay has been offered by Karlin and Kennedy[8] and by Berry.[3]

An apparently significant point is that all these symptoms are found normally in infants and young children. Only when they persist into later childhood and adult life do they attract attention. This becomes obvious when the symptoms are listed in parallel columns.

Normal Infant and Young Child	*Patient With the Syndrome*
Ambilateral*	Left-handed or partly ambidextrous†
Bodily clumsiness	Unusual bodily clumsiness
No speech	Late development of speech
Infantile speech	Infantilisms
Stutters under excitement	Stuttering
Unable to read	Specific reading disability

The various aspects of the syndrome are thus seen to be the result of a rather specialized delay in development. The problem is to find a probable cause for this delay.

Several authors give a clue as to what it may be. Karlin and Kennedy[8] mention a slow rate of neural myelination as a possible cause of delayed development of speech and of stuttering. Berry[3] refers to it as a possible cause of both motor speech delay, and of infantilisms and defective speech. They offer, however, no proof that myelination actually is retarded in these conditions. The most that can be said is that it is widely believed that neuromuscular maturation and myelination are closely associated in the growing infant and young child. Langworthy[9] presents some proof that such is the case.

Common observation tells us that the normally intelligent children of some families tend to master the simple motor skills of early childhood either more quickly or more slowly than the average. There must be, therefore, a familial tempo of neuromuscular maturation underlying the well-recognized individual tempo. If it can be shown that an unusually slow tempo may affect boys more than girls, and may tend to produce the different aspects of the syndrome, we shall have a single, simple, and intelligible hypothesis in place of the present confusion.

Before proceeding further, it is necessary as a background to outline briefly the normal development of handedness, bodily skill, and speech in the average child.

*Equally clumsy with both hands.
†Most sinistrals have more than usual skill in the nonpreferred hand.

of 200 mm. of water, contained a normal amount of sugar, no demonstrable globulin, and 13 mononuclear cells per cubic millimeter. No growth was obtained in cultures of blood or cerebrospinal fluid.

The child's behavior during the first hospital day was described as fretful and hyperactive. He did not recognize his parents but seemed in no pain or distress. He was able to take liquids and his temperature remained around 103° F. Treatment was limited to sedation with paraldehyde and the administration of fluids parenterally. An encephalitis of unknown cause was thought the best explanation for his condition, and the parents were recalled for further questioning in the hope of eliciting information which would aid in establishing an etiologic factor. Trauma, exposure to tuberculosis or mumps, contact with lead or other poisons, environmental prevalence of rodents or birds, and the existence of infectious disease in the other members of the family were touched upon without enlightenment. Questioning was then directed to the incident five weeks earlier, and the story, as reconstructed, was that a recently acquired pup, 7 months of age, had acted peculiarly on the day in question. It was thought that she was in heat and when she disappeared in the evening it was assumed that she had been retained by her finder. Concentrated efforts to locate the animal, then, as well as at the time the child was hospitalized, were to no avail, despite cooperation by newspapers, newscasts, police, humane organizations, and health agencies. Although it appeared clear that the dog had not been in free contact with the patient, it seemed possible that she could have inflicted the wound, had the infant presented his face at the play-pen bars. With this possibility in mind, saliva was collected and utilized as described later in this presentation. Conversation with the breeder from whom the dog was obtained disclosed that the animal had not received antirabic prophylaxis but had been confined closely and that there had been no symptoms among kennel mates.

Periods of hyperexcitability alternating with periods of sleep characterized the third day of illness and the temperature remained at 103° F. Muscular twitching and labored respiration accompanied the hyperactive episodes, and at times the child cried out. Treatment was again limited to fluids, including 60 c.c. of plasma parenterally, and sedation. On the fourth day of symptoms the child was somewhat quieter but his pulse was extremely rapid, the temperature continued at 103° F. and twitching of the muscles was noted on occasion. He lay with his eyes open even when sleeping but made no effort to fix upon his surroundings. He was able to swallow and took 8 oz. of water during the course of the morning. A lumbar puncture was done and the fluid obtained was identical in constitution with that reported earlier. A urinalysis was also uninformative. The fifth day was not greatly different from the preceeding, and, if anything, the patient appeared more quiet and seemed to pass into normal sleep between periods of increased activity. He still was capable of taking sips of water and treatment again consisted of fluids, including plasma parenterally and sedation. From the sixth to the ninth day of illness there was no dramatic departure from the earlier course. Periods of muscular excitability alternated with moments when he slept. Respiratory difficulty

This information from the laboratory and from the nursery leads us directly to several assumptions, unproved but logical: (1) myelination is completed earlier in girls than in boys; (2) because of the common observation that the children of certain families tend to develop either faster or slower than the average, there is a tendency to a familial rate of myelination; (3) each infant has his individual tempo of myelination associated with his individual tempo of neuromuscular maturation; (4) unusually early or unusually late neuromuscular maturation in normal children in normal environments implies equally early or late myelination; (5) when one particular skill appears out of the normal order, either earlier or later than usual, it implies a correspondingly early or late myelination of the particular motor and association tracts needed for that skill.

With these assumptions in mind as a working hypothesis, let us consider, one by one, the various aspects of the syndrome under consideration and the part that a delay in neuromuscular maturation may play in their development.

AMBIDEXTERITY

Slow maturation, by prolonging the period of infantile ambilaterality, gives both hands time to acquire some skill. Habitual use of both hands for several years in early childhood will result in the child's carrying into adult life an unusually large amount of skill in the nonpreferred hand, regardless of whether he finally becomes mainly right or mainly left-handed. Thus, delayed neuromuscular maturation will account for ambidexterity.

LEFT-HANDEDNESS

A prolonged period of ambilaterality, perhaps lasting until the child is 6 years old, instead of fading gradually soon after the first year, inevitably raises the question of whether or not he may be left-handed. This doubt, present in the minds of those about him, often results in the left hand being chosen for training. He will then be regarded by the world as a left-hander, although retaining considerable, often unnoticed, skill in the right hand. This is one, although probably not the only, explanation of left-handedness.

UNUSUAL BODILY CLUMSINESS

When good neuromuscular control is slow in developing, the period of childhood awkwardness is prolonged. Body and hands are manipulated poorly for a longer than usual time, and habitual use tends to fix and perpetuate the clumsiness, particularly in the simple skills which were learned in early childhood. This does not mean that the individual is incapable of acquiring considerable or even expert skill in later childhood. It does suggest that the period of training may be longer and more difficult than in those in whom neuromuscular maturation developed at the normal rate. The end result may be a comparatively clumsy individual who has attained through training and effort considerable skill in certain lines.*

*An extremely clumsy and awkward boy became a successful pilot of large planes during the war, although he is still clumsy and apt to drop and break things in civilian life.

TABLE I. FATE OF MICE INOCULATED WITH SALIVA

MATERIAL INOCULATED	ROUTE OF INOCULATION	NUMBER INOCULATED	RESULTS*
Untreated Saliva	Intracerebrally	8	1, 1, 1, 1, 1, 1, 1, 1
Saliva plus penicillin	Intracerebrally	7	3, 4, 5, 7, 15†, 16†, 16†
Saliva plus penicillin	Intraperitoneally	2	S, S.

*Under results a numeral indicates day of death. The letter "S" indicates survival.
†These mice showed signs of encephalitis and were sacrificed for passage to other mice.

brains of these mice revealed a mixture of Gram-negative and Gram-positive bacteria. Several of the brains were stored at 4° C. to 6° C. in 50 per cent glycerine-saline but were not investigated further because of subsequent findings in the mice which were injected intracerebrally with the penicillin-treated saliva.

All of the seven mice which had been inoculated intracerebrally with the treated saliva appeared sick the following day. Their hair was ruffled and they were less active than normal mice of the same age. On the second day, four of the mice had recovered and again appeared healthy. Of the remaining three, one died on the third day, one on the fourth day and one on the fifth day of bacterial infection. One of the four mice which had been injected intracerebrally with the penicillin-treated saliva, and which appeared sick twenty-four hours later but seemed to have recovered by the second day was found dead on the seventh day, after it had been inoculated. The brain of this animal was not recovered since it had been eaten by the remaining mice. Of the three remaining mice which had been inoculated intracerebrally with the penicillin-treated material, one developed symptoms suggesting rabies encephalitis on the fifteenth day and the other two showed similar symptoms on the sixteenth day. The mouse which had developed symptoms on the fifteenth day was sacrificed. The brain was removed and ground in a mortar with 4 c.c. of saline. The suspension was allowed to stand at room temperature until the large particles settled out and then the supernatant liquid was inoculated intracerebrally into eight mice. Of these latter eight mice, two were found dead on the eighth day and the remainder showed symptoms of encephalitis. A touch preparation of the brain of one of the animals which had developed encephalitis was stained with Seller's stain and Negri bodies were observed.

The two mice which developed symptoms of encephalitis sixteen days after they had been injected intracerebrally with penicillin-treated saliva were sacrificed on the same day they developed symptoms. The brains were removed and ground together in a mortar with 8 c.c. of saline. The supernatant liquid from this suspension was then inoculated intracerebrally into seven mice. One of the seven mice was found dead eight days later and the remaining six showed symptoms of encephalitis. Negri bodies were demonstrated in a touch preparation of the brain of one of these mice. The brain of an additional mouse was fixed in 10 per cent formalin. Sections from the hippocampus of this brain, when stained with hemotoxylin-eosin revealed intracytoplasmic inclusion bodies in the nerve cells.

A prolonged period of ambilaterality in early childhood, during which the two hands are used more or less interchangeably, leaves the individual with a more severe and lasting confusion between right and left. The slower the neuromuscular maturation, the longer the period of confusion; the longer the period of confusion, the more likely is the individual to establish and fix as a habit the occasional and momentary reversal of the direction of eye gaze from left-right to right-left. These reversals lead either to failure in learning to read or to such slow and faulty reading that the child is unable to comprehend what he does decipher. When such children discover that they are being left behind by others no brighter than they, the emotional element, as in stuttering, enters and confuses the picture. Thus a slow rate of neuromuscular maturation, by prolonging the normal period of spatial confusion in hand and eye, seems to be the primary cause of specific reading disability.

PREPONDERANCE OF MALES

On the average, the neuromuscular maturation of boys is slower than that of girls. They are usually a month or more later in mastering the simple motor skills of childhood. By and large they are apt to remain less graceful than girls through adolescence or even for life. Obviously, the same degree of retardation of neuromuscular maturation in a boy and a girl will affect the boy more severely and hence will account for the preponderance of males in the syndrome.

COMMENT

These are very condensed descriptions of the probable relationship between a slow tempo of neuromuscular maturation and the various aspects of the syndrome. Slow maturation appears to be the only factor that all the aspects have in common. From it, as has been shown, they all may be derived. It is argued that in fact they probably are so derived, and that therefore an inherited slow tempo of neuromuscular maturation is the fundamental cause of the syndrome.

This hypothesis in no way denies the importance of psychologic factors in stuttering, and of psychologic and educational factors in specific reading disability. It does suggest that they are not the primary cause. By revealing a common etiology for all the aspects of the syndrome it offers a reasonable explanation for their frequent association in the individual and in his family tree. It aids our understanding of the problem and gives us a simple explanation to present to the parents and to the children themselves.

It stresses the essentially developmental nature of the specific language disabilities and, therefore, should lead to their early treatment before faulty habits of speech and of reading have been firmly fixed by use. It suggests that for children of this type* reading should be postponed until the left-right direction of eye gaze is more firmly established, even though this may mean waiting until the second grade. When they do start to read, they should be taught phonetically and with kinesthetic reenforcement instead of by the "look and say" method.

*Children who were late in talking, are still rather ambidextrous, and lisp or stutter.

definite exposure, we found so little upon which to base a conclusive argument. The clinical observations, physical findings, and laboratory data revealed nothing to be construed as specific to the disease. Certainly, periods of hyperexcitability and hyperactivity alternating with moments of sleep or coma are parts of a variety of syndromes, including most of the virus encephalitides and tuberculous meningitis, while a prolonged febrile course without dramatic laboratory findings likewise fits a number of diseases of the central nervous system. We were especially disappointed in the lack of similarity to tetanus or botulism, conditions with which rabies is said to be frequently confused. The cerebrospinal fluid change, a gradually developing pleocytosis with a predominance of lymphocytes, is again hardly diagnostic and definitely not in accord with the texts where findings vary from no change to a cellular increase attributable to the polymorphonuclear fraction.[2, 3] Finally, rabies is usually described as a disease characterized by difficulty in swallowing (hydrophobia) with death intervening in less than five days from progressive paralysis. In this instance, however, the patient survived eleven days with little evidence of dysphagia and a complete lack of progressive deterioration. In fact, had it not been for contributions from virus studies, this record would have joined many others in the scrapbasket of, "encephalitis of unknown etiology."

While rabies virus has been isolated from the saliva of man,[4-7] this is, to the best of our knowledge, the first instance in which the dianosis of rabies in man has been established by recovering the virus from the saliva. In the case here reported there was no definite history of a bite and in addition there was no opportunity to study the infant's brain either for lesions or virus since an autopsy was not permitted. Therefore a definite diagnosis would not have been made if the virus had not been recovered from the saliva.

The frequency with which rabies virus is present in the saliva of human cases of rabies is not known. Palawandow and Serrebrennja[4-6] isolated the virus from the saliva of four of five patients studied and Sulkin and Harford[7] reported positive results in one of two patients. Sabin and Ruchman, in studying the distribution of the virus in an unvaccinated case, did not find the virus in the saliva.[8] Whether the reported failures to isolate the virus from the saliva have been due to inadequate methods or to the absence of the virus from the saliva of some cases cannot be stated. However, the positive findings reported here, as well as those of Palawandow and Serrebrennja and of Sulkin and Harford, suggest that in human cases the virus may frequently be present in the saliva. Perhaps with improved methods, more positive results will be obtained.

The studies of Pawan[9] would suggest that the etiologic agent of paralytic (Trinidad) rabies is frequently present in the saliva of human patients, since he was able to recover the virus from the saliva of all of the six patients studied. Swabs which had been moistened with saliva were rubbed into the scarified skin of rabbits. The animals became paralyzed and histologic studies revealed Negri bodies in the brains of the animals.

It would appear at present that if rabies virus is to be isolated from the saliva by intracerebral inoculation into mice, the saliva should be treated first

Case Reports

OMPHALOCELE WITH DIAPHRAGMATIC DEFECT AND HERNIATION OF THE LIVER INTO THE PERICARDIAL CAVITY

LIEUTENANT WALLACE W. MCCRORY, AND LIEUTENANT COLONEL ROLLIN F. BUNCH, MEDICAL CORPS, ARMY OF THE UNITED STATES

OMPHALOCELE is an uncommon developmental anomaly. The incidence of occurrence is reported to be one per 5,000 deliveries, and other congenital anomalies are found in one-third of this group.[1] We have recently observed two newborn infants with omphalocele who also had diaphragmatic defects with intrapericardial herniation of the liver and strikingly similar congenital cardiac defects. This unusual combination of congenital malformations prompts the following report.

CASE 1.—A full-term male infant was born spontaneously Sept. 15, 1946, with a birth weight of 6 pounds, 13 ounces. This was the first pregnancy of a 27-year-old white female. Maternal history was negative except for some vaginal bleeding in the second month of gestation. The infant was cyanotic at birth and only partial relief was afforded by continuous oxygen. A fairly large omphalocele (8 cm. × 6½ cm. × 2 cm.) was noted. The defect of the umbilical portion of the abdominal wall was covered only by a transparent membrane through which part of the liver, the omentum, and coils of small intestine were visible. The umbilical vessels coursed through this membrane. This saclike structure protruded above the adjacent abdominal wall. Physical examination of the chest revealed a loud, blowing systolic murmur heard over the entire precordium, loudest to the left of the sternum in the third and fourth intercostal spaces. No thrill was palpated. The lung fields were clear to auscultation and the remainder of the physical examination was otherwise negative. There were no other evident abnormalities. The omphalocele was dressed with penicillin ointment and petroleum jelly gauze. Penicillin was given parenterally 150,000 units daily. The infant was kept in an oxygen hood because of the dusky color and dyspnea. Surgery was postponed in anticipation of improvement in the patient's general condition. Approximately forty hours after birth the peritoneal fluid visualized through the omphalocele was opalescent and the infant's temperature had risen to 103.6° F. A complete blood count revealed a leucocytosis of 14,300 with 83 per cent neutrophiles, 12 per cent lymphocytes, and 5 per cent monocytes, 4,540,000 red blood cells with 14.4 Gm. hemoglobin. The serology was negative. It was felt that surgical repair of the defect was imperative at this time in spite of the cyanosis and dyspnea. The procedure was an extraperitoneal approximation of the normal skin edges over the defect. Postoperatively the infant was started on sulfadiazine in addition to penicillin, parenteral fluids were administered, and feedings were given by gavage because of the respiratory embarrassment. The infant's condition gradually became worse during the following week. There was no vomiting and the stools were normal. The temperature ranged from 99 to 103.8° F. The dyspnea steadily

From the Out-Patient Service and the Radiological Service, Walter Reed General Hospital, Washington.

REFERENCES

1. Reed, L. J., and Muench, H.: Am. J. Hyg. 27: 493, 1938.
2. Levinson, A.: Cerebrospinal Fluid in Health and Disease, ed. 2, St. Louis, 1929, The C. V. Mosby Company, p. 317.
3. Van Rooyen, C. E., and Rhodes, A. J.: Virus Diseases of Man, London, 1940, The Oxford University Press, p. 640.
4. Palawandow, H., and Serebrennaja, A. I.: Ztschr. f. Immunitätsforsch. u. exper. Therap. 66: 519, 1930.
5. Palawandow, H., and Serebrennaja, A. I.: Ztschr. f. Immunitätsforsch. u. exper. Therap. 68: 236, 1930.
6. Palawandow, H., and Serebrennaja, A. I.: Ztschr. f. Immunitätsforsch. u. exper. Therap. 71: 350, 1931.
7. Sulkin, E. S., and Harford, C. G.: Ann. Int. Med. 19: 256, 1943.
8. Sabin, A. B., and Ruchman, I.: Proc. Soc. Exper. Biol. and Med. 44: 572, 1940.
9. Pawan, J. L.: Ann. Trop. Med. and Parasitol. 31: 267, 1937.
10. Koch, J.: Handbuch der pathogenen Mikro-Organismen. 1930, vol. 8, p. 553.
11. Negri, A.: Ztschr. f. Hyg. 43: 507, 1903.
12. Kraus, R., Gerlach, F., and Schweinburg, S.: Lyssa bei Mensch und Tier. Vienna, 1926, pp. 80, 128-131. (Quoted from Sabin and Ruchman).

floor is attached to the abdominal wall. This shelf-like ridge constricted the liver tissue that was protruding into the pericardial cavity. The omphalocele extended to this rudimentary ledge, and hence the uppermost edge of the omphalocele was overlying the lower border of the pericardial cavity (Fig. 3). Dissection of the heart revealed a typical tetrad of Fallot, dextroposition of the aorta, interventricular septal defect, a bicuspid pulmonary valve and stenotic pulmonary conus, and hypertrophy of the right ventricle. The foramen ovale was functionally as well as anatomically patent. The ductus arteriosus was closed. There was an acute fibrinous pericarditis and peritonitis, and the pericardial cavity contained a moderate amount of fluid. No other abnormalities were found and the microscopic examination revealed no other additional pathology. The pericardial herniation of the liver produced the undefined mass seen in the x-rays The increase in the size of the cardiac silhouette was not solely the result of congenital heart disease but was in part due to displacement by the liver and to the pericarditis with moderate effusion caused by the extension of the peritonitis through the pericardial-peritoneal communication.



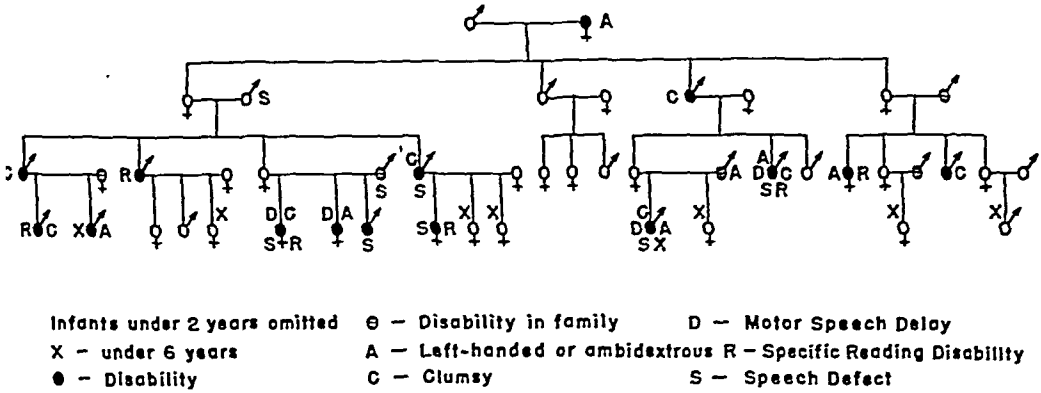
Fig. 2.—Viscera of patient in Case 1 removed en bloc, viewed from above and anteriorly. The circular defect in the floor of the pericardium and diaphragm is shown. Herniated portion of liver is visible at lower margin of defect.

Case 2.—A full-term male infant was born spontaneously Oct. 3, 1946. Birth weight was 6 pounds, 5 ounces. This was the second pregnancy of a 27-year-old white female. The maternal history was negative. Her first pregnancy was normal and the child is living and well. At birth an omphalocele similar to that in Case 1 was noted. The protrusion was greater than in the previous case. The defect measured 9 cm. × 7 cm. × 3 cm. The liver, omentum, and loops of small intestine were visible through the transparent covering of the defect. The infant was cyanotic without oxygen. Physical examination revealed a blowing systolic murmur heard over the precordium and to the right of the

families. Statistical proof of the familial incidence of stuttering and left-handedness is supplied by Berry,[3] Nelson,[4] and West.[5] Family trees showing an incidence of disability of approximately 40 per cent have been published by Orton[6] and by Cobb.[7] The positive evidence appears too well authenticated to be discarded.

Another family tree is offered as further proof. Every member through four generations has been personally known by the writer. Some of the third generation and most of the fourth have been carefully studied as well. (See Fig 1.)

FAMILY TREE, SHOWING INCIDENCE OF
LANGUAGE DISABILITIES AND ASSOCIATED CONDITIONS



Infants under 2 years omitted — Θ — Disability in family — D — Motor Speech Delay
X — under 6 years — A — Left-handed or ambidextrous — R — Specific Reading Disability
● — Disability — C — Clumsy — S — Speech Defect

Fig. 1.

Of thirty-three descendants over 2 years old, fourteen (42 per cent) show one or more of the disabilities. Of twenty-five descendants over 6 years old,* twelve (48 per cent) show one or more of the disabilities. Most of these disabilities are comparatively mild.

Obviously, neither ambidexterity nor left-handedness is any great drawback to a successful life. Unusual bodily clumsiness merely leads to a lack of prowess on the athletic field. Motor speech delay by itself is of no great import, although it frequently precedes defective speech. None of the latter in this series have been severe.

Specific reading disability, on the other hand, has been a great handicap to the three boys afflicted by it. In the three girls it has been much milder and has responded much more quickly to remedial training.

This brief review leaves us puzzling over the origin and the nature of a familial syndrome found in otherwise normal persons, chiefly males. It comprises at least five apparently unrelated symptoms: bodily clumsiness, left-handedness and ambidexterity, late development of speech, lisping and stuttering, and specific reading disability. These occur singly or in any combination

*Old enough to show whether or not they are going to have trouble with reading.

had a serious congenital cardiac defect in addition to the omphalocele. Milk aspiration and atelectasis as a cause of death was considered. The post-mortem examination again demonstrated a diaphragmatic defect with absence of the pericardial floor in addition to the omphalocele. The defect was larger than in case one (Fig. 5, *A* and *B*). The only evidence of the falciform ligament was a cordlike strand that arose from the left lobe of the liver and fused with the inferior edge of the posterior pericardial sac. There was no rudimentary ledge ventrally where the ventral portion of the diaphragm normally attaches. The uppermost part of the amnioperitoneal membrane extended over the caudal part of the pericardial cavity. The anterior surface of the liver was adherent to this membrane and the liver was abnormally rotated The "dome" of the liver was anterior; the right lobe was superior and extended into the pericardium, displacing the heart to the right and upward. The gallbladder was on the dorsal surface and the umbilical vessels were inserted into

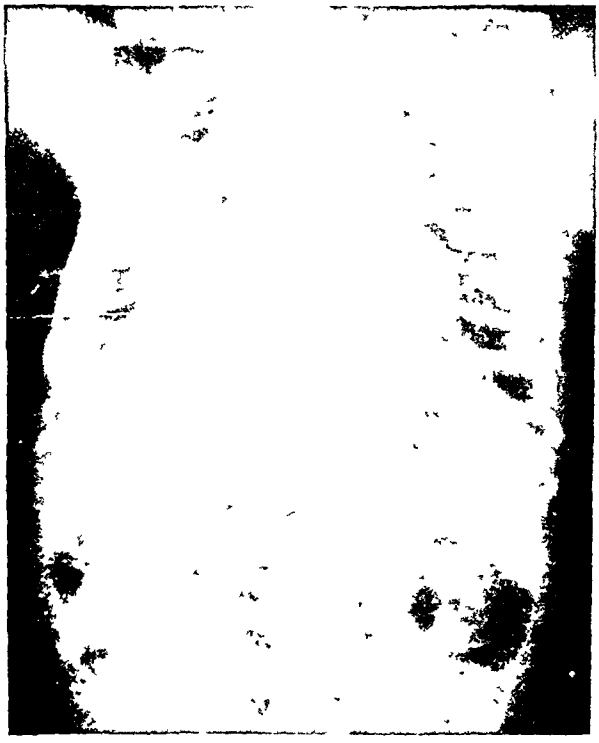


Fig. 44.—Case 2. X-ray shows collapsed upper lobe of right lung, cardiac displacement to the right, and elevation of the lower margin of the liver. Umbilical cord is visualized above right costophrenic angle

the anterior surface. The pleural portions of the diaphragm were normal and free from any defects Both lungs were markedly atelectatic, the lower lobes of both lungs were only partially expanded, the remainder nonair containing The tracheobronchial tree contained no evident mucous plug and no milk or foreign matter. The heart showed multiple congenital defects: a patent foramen ovale and second interatrial septal defect, an interventricular septal defect, hypertrophy of the right ventricle, and a widely patent ductus arteriosus There was no dextrocardia and the pulmonary valve and artery were apparently normal. There was no evidence of peritonitis and there were no other abnormal

The young infant is not ambidextrous but rather ambilateral, equally clumsy with both hands.[2] By the end of the first year, neuromuscular maturation has progressed sufficiently for him to have developed some skill in both. The first signs of unilateral-handedness and of speech appear about then or during the second year. The choice of the preferred hand, weak at first, gradually strengthens through the years. Laterality statistics on preschool, grammar school, and high-school children and on adults show a constantly diminishing amount of left-handed skill,[2] facts which suggest that the inheritance factor in handedness, even if originally present, is not very strong, except, perhaps, in the few (1 to 5 per cent) individuals who persist in their sinistrality.

Why the right hand is usually chosen is not known with any certainty. Most favor inheritance as the reason, some the precept and example of life in a right-handed world.* Even the supporters of the inheritance theory agree that the latter influence swings many whom they consider were originally left-handed over to the right. It seems quite clear that the confirmation, if not the origin, of unilateral handedness is largely a developmental process, habitual use constantly strengthening the original choice.

From textbooks and articles on histology[9-11] and physiology[12] we learn the following pertinent facts about the myelination of the nervous system: Some muscular activity is possible before myelination begins, but the responses are slow, weak, and diffuse. The rate of myelination is greatly accelerated at the time of birth, suggesting that functional use stimulates the process. The myelination of the different tracts follows a definite sequence. Each tract has its own rate of myelination. It is not completed in the corticospinal tracts until the second year, in the spinal nerves until the third year, and in the association fibers until still later. In the cord it is not completed until between the fifteenth and twentieth years. It develops simultaneously in the fibers of different, although functionally related, tracts. Since Flechsig, it has been generally believed, although not definitely proved, that full functional activity of a medullated nerve depends upon the completion of its myelination.

From textbooks and articles[9,13,14] on child development we learn the following about neuromuscular maturation: In normal infants and young children the various skills appear in fairly definite sequence. The rate of development varies from child to child, each possessing his individual tempo. In general, girls are one or more months ahead of boys. It is widely believed, although not absolutely proved, that the full attainment of any particular skill depends first upon the myelination of the motor and association tracts concerned, and second upon practice. Langworthy[9] strengthens this belief by a long list of sensory and motor functions in the newborn and young infant, correlating their presence at birth or their appearance in the early months of life with the myelination of the nerve tracts concerned.

Obviously, myelination and neuromuscular maturation are closely related and probably mutually dependant on each other. If this is so, the observable development of neuromuscular maturation may be regarded as an indicator of the unseen development of myelination.

*No one knows why the world is predominantly right-handed.

Steiner,[14] Ladd and Gross,[15] and Weinberg[16]). Sievers[17] reported a similar case of omphalocele with intrapericardial herniation of the liver in Germany in 1928 and reviewed other cases reported in the German literature.



Fig. 5A.—Case 2. Viscera removed en bloc, ventral aspect. Both lungs are atelectatic. Pericardium is reflected at upper margin of omphalocele.

DISCUSSION

There is considerable confusion in the literature in the definitive terminology of protrusive malformations of the umbilicus. Some of the synonyms are umbilical hernia, exomphalocele, exomphalos, hernia funiculi umbilicalis, ectopia viscerum, amniotic hernia, amniocele, and congenital eventration at the umbilicus. The present trend is toward simplification of the nomenclature, using the terms omphalocele, hernia into the cord, and congenital umbilical hernia to classify the defects encountered. As defined by Margulies[6] "Omphalocele should apply to the anatomical and formational entity involving the supraumbilical and umbilical portion of the abdominal wall, to differentiate it from a hernia into the cord, in which loops of intestine, liver, or omentum protrude through a small ring into the cord and from true umbilical hernia covered by skin."

SPECIFIC LANGUAGE DIFFICULTIES

These all may be regarded as more localized forms of general bodily clumsiness affecting specifically the neuromuscular control of speech and, in specific reading disability, the direction of eye gaze.

Motor Speech Delay.—It is obvious that speech is impossible until neuromuscular maturation has progressed to the point where there is good control over the muscles used in talking. Therefore, a slow rate of maturation will inevitably retard the development of speech. This point has already been made by Karlin and Kennedy[8] and by Berry[3] when they suggested that retarded myelination might be the cause of motor speech delay.

Infantilisms.—The speech of small children normally is full of defects to which we pay no attention. These defects are sound substitutions, such as *w* for *r*, and *th* for *s*, and sound omissions. They also not uncommonly reverse, as *overlaws* for *overalls*. When these defects persist into late childhood and adult life they are classed as infantilisms. Slow development of skill in speaking due to a slow tempo of maturation gives some of these defects a chance to become fixed by habitual use and hence will account for the frequency of infantilisms in the syndrome.

Stuttering.—Under sufficient stress almost anyone may stutter. These children do so under minor stress and are apt to begin their stuttering at one of three special periods of rapid development. Commonly it is soon after they begin to talk, less often when they begin to read, and occasionally it develops during adolescence when much more is expected of both speech and reading. It also may appear first after a fright, an accident, or an illness, any one of which may act as the stimulus which turns a potential into an actual stutterer.

Delayed neuromuscular maturation has equipped the potential stutterer with a speech mechanism which functions too slowly and clumsily to keep up with the rapidly increasing flow of ideas demanding utterance. Under strain it momentarily breaks down entirely, as in speech block, or becomes disorganized, as in the meaningless repetition of a single sound. The effort to force speech then produces an overflow of nervous energy which shows itself in the well-known bodily tensions, contortions and grimaces. After a few failures the emotional element enters the picture, and well-justified fear of stuttering tends to perpetuate the habit.

The poor athlete, the poor dancer is only slightly affected by his disability, but the stutterer is severely crippled in his relations with his fellows. It is easy to understand why the emotional element in stuttering bulks so large and is regarded by many as the fundamental cause.

Specific Reading Disability.—The essence of specific reading disability is an uncertainty in spatial orientation (Blau), a confusion between the right-left and the left-right directions, showing itself as a tendency to reverse at irregular intervals the direction of eye gaze. Many children do this when they first start to read, particularly if they are taught by the "look and say" method instead of phonetically, but most correct themselves within a few weeks or months. Evidently a certain amount of spatial confusion may be present normally in first grade children.

of an amnion covered gap, and the result is an amniocele (omphalocele). These processes are completed by the third week of fetal life, while the withdrawal of the abdominal contents from the extracelomic cavity normally occurs in the eighth to tenth week. Margulies thus concludes that failure of the withdrawal of the abdominal contents of the umbilical sac cannot produce an omphalocele, but rather results in a true hernia into the cord.

Sievers[17] in his report of a case similar to ours, states that omphalocele is probably related to faulty development of the septum transversum with a consequent deficiency in the supraumbilical portions of the abdominal wall. He discusses other cases of omphalocele associated with pericardial-diaphragmatic defects of varying degree, some so extensive that the heart was found lying in the peritoneal cavity.

The pericardial floor and contiguous diaphragm and the ventral diaphragmatic attachment is derived from the septum transversum.[18] It forms the later centrum tendinum of the diaphragm. The complete diaphragm is formed by the fusion of the pleural portions with this central portion in a complicated manner.[18] In both of our cases the pleural portions of the diaphragm were normally formed and free from any communications with the peritoneal or pericardial cavities. Since the defects present in our cases involved only the central portion of the diaphragm and the pericardial floor, these could well be the result of a local deficiency in the development of the septum transversum.

We present these two cases with their associated defects for their clinical and embryologic interest. The successful repair of an intrapericardial herniation of the liver not associated with omphalocele reported by Gross[8] indicates that this defect is not incompatible with life. The reported mortality rate in omphalocele is less than 50 per cent. The severe congenital cardiac defects present in our two patients were probably the major cause of death.

SUMMARY

1. Two cases of omphalocele with absence of the pericardial floor, intrapericardial herniation of the liver and severe congenital cardiac defects are reported.

2. The literature on the subject is reviewed.

3. The embryologic explanations of the mechanism responsible for the development of omphalocele are discussed.

REFERENCES

1. O'Leary, C. M., and Clymer, C. E.: Am. J. Surg. 52: 38, 1941.
2. Gross, R. E., and Blodgett, J. B.: Surg. Gynec. & Obst. 71: 520, 1940.
3. Specht, N. W., and Shryock, E. H.: Surg. Gynec. & Obst. 77: 319, 1943.
4. Stein, J. L., and Gerber, A.: J. PEDIAT. 14: 89, 1939.
5. Jarcho, J.: Surg. Gynec. & Obst. 65: 593, 1937.
6. Margulies, L.: Am. J. Obst. & Gynec. 49: 695, 1945.
7. O'Brien, H. D.: J. Anat. 74: 131, 1939.
8. Gross, R. E.: Am. J. Dis. Child. 71: 579, 1946.
9. Hedblom, C. A.: J. A. M. A. 85: 947, 1926.
10. Harrington, S. W.: Ann. Surg. 115: 705, 1942.
11. Hartzell, J. B.: Am. J. Surg. 48: 582, 1940.
12. Truesdale, P. E.: New England J. Med. 213: 1159, 1935.
13. Orr, T., and Neff, F. C.: J. Thoracic Surg. 5: 434, 1936.
14. Greenwald, H. M., and Steiner, M.: Am. J. Dis. Child. 38: 361, 1929.
15. Ladd, W. E., and Gross, R. E.: New England J. Med. 223: 917, 1940.
16. Weinberg, J.: Surg. Gynec. and Obst. 72: 445, 1941.
17. Sievers, R.: Arch. f. klin. Chir. 153: 703, 1928.
18. Bremer, J. L.: Arch. Path. 36: 539, 1943.

SUMMARY

A family tree covering four generations illustrates the familial nature of left-handedness and ambidexterity, bodily clumsiness, and the specific language disabilities. These conditions occur together in the individual and in his family tree sufficiently often to constitute a syndrome. The only factor that they appear to have in common is a slow tempo of neuromuscular maturation, which may be general or may be most conspicuous in certain skills. This slow maturation probably implies an equally slow tempo of myelination of motor and association nerve tracts. It is suggested that this inherited tendency to delayed neuromuscular maturation is the single factor from which all the various aspects of the syndrome may develop.

REFERENCES

1. Witty, P., and Kopel, D.: Reading and the Educative Process, Boston, 1939, Ginn and Company.
2. Blau, Abram: The Master Hand: Research Monographs No. 5, New York, 1946, American Orthopsychiatric Association, Inc. (These two contain excellent summaries and bibliographies.)
3. Berry, M. F.: The Developmental History of Stuttering Children, J. PEDIAT. 12: 209, 1938.
4. Nelson, S.: The Role of Heredity in Stuttering, J. PEDIAT. 14: 642, 1939.
5. West, R.: In Brennemann's Practice of Pediatrics, vol. IV, chap. 14, p. 25.
6. Orton, S. T.: Reading, Writing, and Speech Problems in Children, New York, 1937, W. W. Norton & Co.
7. Cobb, S.: Borderlands of Psychiatry, Cambridge, Mass., 1943, Harvard University Press.
8. Karlin, I. W., and Kennedy, L.: Delay in the Development of Speech, Am. J. Dis. Child. 51: 1138, 1936.
9. Langworthy, O. R.: Development of Behavior Patterns and Myelinization of the Nervous System in the Human Fetus and Infant, Contributions to Embryology, Carnegie Institution of Washington, vol. XXIV, No. 139, 1939.
10. Bremer, J. L.: Textbook of Histology, Philadelphia, 1936, P. Blakiston's Sons & Co.
11. Carleton, H. M.: Schaefer's Essentials of Histology, Philadelphia, 1938, Lea & Febiger.
12. Best, C. A., and Taylor, N. B.: The Physiologic Basis of Medical Practice, Baltimore, 1945, ed. 4, William & Wilkins Company.
13. Gesell, A.: In Brennemann's Practice of Pediatrics, vol. I, chap. 9.
14. McGraw, M. B.: The Neuromuscular Maturation of the Human Infant, 1943, Columbia University Press.

per cubic millimeter, polymorphonuclears 70 per cent, lymphocytes 30 per cent, hemoglobin 14.5 Gm., and 4.8 million red blood cells.

X-ray examination at this time revealed moderate separation of all intracranial sutures, particularly in the basiocciput with no evidence of bony involvement of the upper extremities. No pulmonary pathology was evident.

A subdural tap was performed bilaterally but bloody fluid was not obtained. A spinal tap between the second and third lumbar vertebrae was unsuccessful. A cisternal puncture revealed clear, colorless, spinal fluid containing 5 lymphocytes per cubic millimeter, protein 74 mg. per cent, sugar 65 mg. per cent, with negative serology and colloidal gold, and which was sterile on culture.

Orthopedic consultation noted a "spastic contraction of all fingers of the left hand, with thumb markedly adducted and the wrist markedly flexed. The right hand is in flexion but extension of the fingers and wrist does occur.

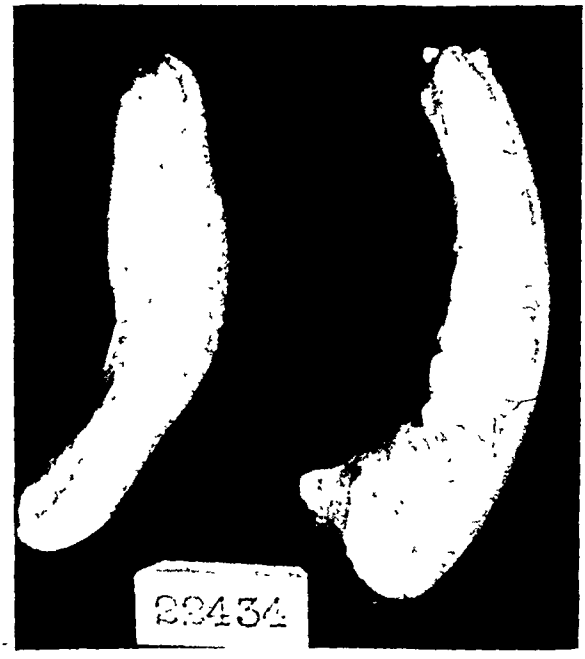


Fig. 1.—Section through entire thickness of skin and subcutaneous tissue. Note "nodular" pattern.

Diagnosis.—Cerebrospastic with flexion contracture of both wrists, more marked on left.

On October 22, a biopsy of one of the indurated areas on the calf was performed. The specimen consisted of skin and subcutaneous tissue which was moderately firm and white. The microscopic section of skin and subcutaneous tissue showed intact epidermis with normal morphology. The subcutaneous fat layer was traversed by thick, fibrous, collagenous trabeculae and areas of looser connective tissue, throughout which were numerous foreign-body giant cells containing from 5 to 30 nuclei. The diagnosis was sclerema adiposum neonatorum.

The infant began to vomit again and rapidly developed signs of dehydration. A pinhead-sized draining sinus was noted over the lesion of the left forearm. Subcutaneous clyses were administered. At this time the hemoglobin was 12.5

increased, the heart tones grew distant, and the murmur became inaudible. The baby developed severe air-hunger during its eighth postoperative day and died on the ninth postoperative day.

The first x-ray taken the first day postnatally (Fig. 1) showed cardiac enlargement and a typical "Coeur en Sabot" deformity, suggestive of the tetrad of Fallot. There was an area of homogeneous increased density in the lower portion of the thorax with a smooth margin convex cephalically. It extended across the midline from the domes of the leaves of the diaphragm. The significance of this mass was not clear in spite of the elevation of the lower margin of the liver. Post mortem this mass proved to be the herniated superior surface of the right lobe of the liver. Later films showed only an increase in the size of the heart. Clinically we felt the infant had a severe congenital cardiac defect, probably a tetrad of Fallot. In view of the progressing evidence of cardiac failure we presumed congenital heart disease coupled with peritonitis to be the cause of death. The significant anatomic findings follow. The pericardium was normally formed except for the lower portion or floor. This was absent and the superior surface of the right lobe of the liver was protruding



Fig. 1.—Case 1, with the typical "Coeur en Sabot" deformity of the heart, intrapericardial herniation of the liver (arrows) and elevation of the lower margin of the liver.

through the defect (Fig. 2). The apex of the heart was displaced to the left and upward by the liver. The pleural cavities were normally enclosed and the diaphragm and pericardium were without other defects. The ventral surface of the liver was adherent to the amnioperitoneal membrane. The falciform ligament fused with the inferior edges of the left lateral and posterior portions of the pericardial sac. The peritoneal cavity was thus closed dorsal to the falciform ligament but ventrally it was in free communication with the pericardial cavity. There was a rudimentary ledge ventrally where the portion of diaphragm that normally covers the dome of the liver and forms the pericardial

surfaces of the forearms, and both calves. The thyroid was not palpable. The abdomen was moderately distended. Both testes were descended. The adipose tissue measured 3 mm. over the thorax and 6 mm. over the abdomen. The superficial layer was firm and divided into numerous distinct grayish brown lobules beneath which a deeper layer of white, gelatinous, transparent, glistening fat was noted. Many cutaneous nerves were distinctly seen within this portion of skin.

The peritoneal cavity contained about 100 c.c. of clear, straw-colored fluid with a few fibrin flakes. The stomach was moderately distended; the intestines were collapsed. The liver extended 4 cm. beneath the right costal margin in the midclavicular line, 1 cm. beneath the xiphoid process, and the left border was at the left costal margin in the midclavicular line. The urinary bladder was distended. The kidneys and ureters were in their usual position. The thoracic and abdominal cavities showed nothing unusual. The thymus was small and contained a moderate amount of surrounding fat. The brain showed an area of softening measuring 1 x 1 cm. in the gyri of the right temporal area just beneath the cortex.

Histologically, the epidermis and cutis showed normal morphology. The subcutaneous fat revealed numerous branching trabeculae composed of dense collagenous connective tissue, the borders of which were lined by young fibroblasts and giant cells and contained large proliferating blood vessels, some obliterated. At the junction of the subcutis and fat, there was a thin reactive band of fibroblasts, occasional lymphocytes and polymorphonuclears as well as numerous foreign-body giant cells containing five to thirty nuclei. Special fat stain (Sudan III) showed numerous neutral fat crystal in the adipose layer. When examined with a polarizing microscope, using crossed Nicol prisms, these crystals were seen to rotate the plane of polarized light and shined brilliantly throughout the section.

Microscopic examination of all the remaining organs revealed normal histology except the liver, which showed hydropic degeneration and cloudy swelling of the parenchyma with distention of the sinusoids.

COMMENT

A review of the literature reveals a marked confusion between the terms sclerema, pseudosclerema, and scleredema, which many authors use interchangeably. This concept is erroneous since each can be differentiated clinically and pathologically.

Sclerema is characterized by:

1. Onset: within the first two weeks of life.
2. Distribution of lesions: Parts with most fat involved such as cheeks, buttocks, back and extremities (thighs, calves, and forearms). The lesions of the extremities tend to follow the long axis.
3. Palpation: discrete, nontender, nonfluctuant, nonpitting, firm, indurated lesions, with irregular borders. The skin is not movable over the lesion.
4. Color: prevailing tint of skin.
5. Course of lesions: no regression or calcification; possible ulceration.
6. Systemic effects: subnormal temperature, gastrointestinal upset, dehydration, debility, and death after several weeks or months.

Pseudosclerema, or subcutaneous fat necrosis, is usually traumatic in origin with no uniform distribution, occurring at any age, without systemic effects, and characterized locally by tenderness, an overlying, freely movable skin.

sternum. The heart tones were loudest over and to the right of the sternum, suggesting the possibility of a dextrocardia. No thrill was palpated. The infant showed no other congenital abnormalities and the physical examination was otherwise negative. The defect was surgically repaired within four hours after birth to avoid peritonitis as occurred in our first case. The procedure was again extraperitoneal approximation of the normal skin edges of the defect. The baby did poorly postoperatively in spite of penicillin, sulfadiazine, parenteral fluids, oxygen, and gavage feedings. Respirations became progressively more irregular, shallow, and gasping. The temperature rose to 102.4° F. eight hours postoperatively. Twenty-four hours postoperatively the infant developed severe respiratory embarrassment following a gavage feeding. Auscultation of the lung fields, previously clear, revealed diffuse fine and coarse wet râles. The formula was reaspirated immediately after the feeding. Pharyngeal



Fig. 3.—Ventral aspect of viscera, Case 1. Superior margin of amnioperitoneal membrane at lower margin of pericardium and overlying intrapericardial portion of herniated liver. Constriction imprint on lower anterior surface of liver delineates portion herniated into omphalocele.

aspiration produced no improvement. Dyspnea rapidly increased and respirations ceased two hours later, thirty hours after birth. Laboratory studies showed a leucocyte count of 13,200 with 71 per cent neutrophiles, 23 per cent lymphocytes, 4 per cent monocytes, and 2 per cent eosinophiles, 5,300,000 red blood cells with a hemoglobin of 16.1 Gm. The serology was negative. The x-ray taken preoperatively showed an enlargement of the heart to the right which was attributed to either dextrocardia or displacement, the latter most probable since the apex appeared to be seen to the left of the sternum. The upper lobe of the right lung was atelectatic. The right leaf of the diaphragm was elevated and the inferior margin of the liver appeared to be displaced ventrally into the omphalocele (Figs. 4*A* and 4*B*). Clinically we felt this infant

ADENOLEIOMYOFIBROMA OF THE TONGUE

Report of a Case in an Infant

Eugene L. Slotkowski, M.D., and Maxwell P. Borovsky, M.D.
Chicago, Ill.

TUMORS of the tongue in early infancy are very uncommon and are usually cystic in origin. Most of these cysts are formed from the retention of secretions in one of the numerous mucous glands present in the tongue and usually appear near the lingual base. They may produce stridor, dyspnea, difficulty in deglutition, and cyanosis. Pressure of the tumor against the epiglottis may completely occlude the laryngeal orifice and result in asphyxia.[1, 2]

A thyroglossal cyst at the base of the tongue is located in the midline and results from incomplete obliteration of the thyroglossal duct. It may not appear or produce symptoms until adult life.

Ranulae are acquired or congenital retention cysts of the salivary ducts or mucous glands in the floor of the mouth. They may reach the size of a plum at the time of birth[3] and surgical intervention (aspiration of the contents) is necessary to reduce the size of the mass which interferes with the mobility of the tongue and coordinated deglutition. Some ranulae can be completely excised, because they involve glands which have no connection with the salivary group.

The descent of the thyroid gland may be arrested at any point between the foramen cecum and its normal destination, with the tongue being one of the aberrant locations of this gland. Montgomery,[4] in his comprehensive review of lingual thyroid, lists several cases of this condition found in infants at autopsy, one of them in the newborn period. It is not clear whether the lingual thyroid contributed or was the cause of death in these instances.

Glandular tumors of the tongue in infants are exceedingly rare. Hickman, in 1869, reported a case which occurred in a newborn infant and caused suffocation sixteen hours after birth with the tumor mass extending from circumvallate papillae nearly back to the epiglottis. Pattie[5] reported a case of a 3-month-old infant with difficulty in feeding, regurgitation of food, choking, dyspnea and cyanosis. The mass was first noticed by the mother while the infant was crying. A pedunculated tumor (2 x 1.5 x 1 cm.) was found to be attached in the midline near the base of the tongue. Microscopic section revealed normal mucous glands surrounded by tongue muscle fibers, fibrous and adipose tissue.

CASE REPORT

F. S., a 9-month-old Negro female infant, was admitted to the Children's Division of Cook County Hospital on Feb. 2, 1947. The mother stated that several days prior to admission she noticed a small ball-shaped structure in the patient's mouth which flipped up from the base of the tongue when the infant cried. Prior to that time it had not been noticed. The infant never had any difficulty in deglutition or respiration. Except for a rash on the scalp the patient had been in good health.

The physical examination revealed a well-developed, well-nourished, Negro female child, who did not appear ill. A small number of crusted papules covered the face and cheeks. Inspection of the pharynx disclosed a fleshy, smooth,

From the Children's Division of Cook County Hospital.

findings. The microscopic examination revealed no additional abnormalities. In this case, the diaphragmatic defect and herniation of liver produced pronounced displacement of the heart to the right, but there was no x-ray evidence of intrathoracic herniation of the liver. The cardiac displacement due to the herniation of the liver and atelectasis simulated the picture of dextrocardia.



Fig 4B.—Lateral view of patient in Case 2 showing omphalocele and ventral displacement of liver.

REVIEW OF THE LITERATURE

We were unable to find a descriptive report of a similar case in the American literature or mention of such a case in the larger series of omphalocele reported (O'Leary and Clymer,[1] ninety-one cases; Gross and Blodgett,[2] twenty-two cases; Specht and Shryock,[3] five cases; Stein and Gerber,[4] four cases; Jarcho,[5] and Margulies[6]). The occurrence of intrapericardial herniation of abdominal viscera in congenital diaphragmatic hernia not associated with omphalocele is most uncommon. One such case is reported by O'Brien.[7] Gross[8] reported a case with herniation of the liver into the pericardium that was successfully operated upon. Hedblom[9] in a review of all cases of diaphragmatic hernia reported up to 1924 listed the pericardium as the site of one herniation but did not describe the case. The larger series of case reports of congenital diaphragmatic hernia and reviews of this subject since 1912 make no mention of such defects (Harrington,[10] Hartzell,[11] Truesdale,[12] Orr and Neff,[13] Greenwald and

Fig. 3.



Fig. 4.

Fig. 3.—Photomicrograph under low power magnification showing nests of mucous glands, dilated ducts, muscle fibers, and connective tissue.

Fig. 4.—Photomicrograph of periphery of nodule under low power magnification showing stratified squamous epithelium and lymphocytic infiltration in submucosa.

The embryologic mechanism responsible for omphalocele is still indefinite. By some the assumption is that the defect results from the failure of the organ contents of the umbilical sac to withdraw into the celomic cavity at about the third month of fetal life, thus preventing the normal formation of the umbilicus (O'Leary and Clymer,[1] and Jarcho[5]). Others feel that retarded development of the abdominal parities may give rise to a disparity between the size of the abdominal viscera and the abdominal cavity (Gross and Blodgett,[2] Specht and Shryock[3]). In his excellent discussion of the subject, Margulies[6] revives interest in the possible significance of faulty growth of the primitive septum transversum as a causative factor in the production of omphalocele. He cited the work of German embryologists on the development of the ventral body wall. According



Fig 5*B*.—Case 2. Viscera with pericardium and amnioperitoneal membrane reflected. Defect in floor of pericardium and diaphragm is shown. Imprint of the heart is visible on liver surface.

to these authors, the supraumbilical part of the abdominal wall has a transient covering of amnion. This is normally moved caudad to the umbilical cord by the growth of liver cells into and connective tissue from the septum transversum. In this way it gives rise to the supraumbilical portion of the abdominal wall. This process is dependent on the concrescence of the amniotic covering and the tissues of the septum transversum. Failure of such union or of proliferation of the connective tissue from the septum transversum would allow persistence

SALMONELLA CARRIER TREATED SUCCESSFULLY WITH STREPTOMYCIN

HELEN E. SWILLER, M.D., A. IRVING SWILLER, M.D., AND
FREDERICK B. TRAUB, M.D.,
BROOKLYN, N. Y.

THE problem of the carrier state in Salmonella infections has always been of interest, especially from the epidemiologic viewpoint, and it is for this reason that the following case is reported.

On Sept. 23, 1946, an 8-month-old white male infant suddenly developed profuse watery diarrhea, passing twenty stools in the first twenty-four hours, the temperature rising to 103.8° F. Examination revealed a rather pale, acutely ill infant; skin was hot and dry, turgor fair, and the fontanelle was not depressed. Examination was otherwise negative and no obvious cause was found to account for the fever and diarrhea. Two weeks prior to this onset, the child had had an acute nasopharyngitis with a febrile rise for which he was treated with sulfadiazine, and the infection subsided in forty-eight hours. His past history was otherwise negative.

The child was treated by withholding all food for ten hours meanwhile giving fluids ad lib and sulfadiazine gr. 1 per pound of body weight per twenty-four-hour period in doses every four hours. With some subsidence of the diarrhea, boiled skimmed milk, gelatin, and banana were gradually introduced. His stools became reduced in number, eight to ten daily, and smaller in size, consisting mainly of jellylike globs of mucus mixed with small amounts of blood. His temperature gradually subsided to 100.6° F. and then fluctuated between 100.6 and 101° F. On the fourth day, the spleen became palpable two fingerbreadths below the subcostal margin, and a cluster of small pink papules were seen scattered over the right side of the abdomen. A solitary lesion on his chin appeared very much like a "rose spot" of typhoid.

On September 28, the stool was cultured for pathogens, and organisms of Salmonella Group C_2 were isolated and later identified as *Salmonella newport*. Sulfasuxidine was started in doses of 5 grain per pound of body weight per twenty-four hour period, divided into equal doses every six hours. Bowel movements continued six to eight daily and consisted of partially digested food admixed with glary mucus. Blood which had been invariably present disappeared from the stool after the first day on sulfasuxidine. Sulfasuxidine was continued for three weeks, the temperature gradually subsided to normal after one week, and the bowel movements returned to a normal consistency, three to five stools daily with less mucus. The spleen remained palpable for three months. Rectal swabs were cultured every other day during this period and thereafter and were invariably positive for Salmonella.

At no time did anyone else with whom he was in close contact show a positive culture and the source of his infection was never ascertained. Inasmuch as positive cultures were invariable, and although the child was clinically well, for public health reasons he was kept apart from other children. It was finally decided to try to rid his bowel of the organism by the use of streptomycin orally. A sensitivity to this antibiotic was determined in vitro and it was found that ten units of streptomycin per milliliter of medium inhibited the growth of the organisms.

On Jan. 14, 1947, four months after the onset, the infant was started on streptomycin, one gram daily (one million units) given orally in three equally divided doses. The streptomycin was dissolved in 5 c.c. of distilled water, yielding a solution of 6 c.c., and the patient was given 2 c.c. in fruit juice

From the Jewish Hospital of Brooklyn.

SCLEREMA ADIPOSUM NEONATORUM

ALBERT STERNBACH, M.D., AND JOSEPH ROBINSON, M.D.
BROOKLYN, N. Y.

SCLEREMA adiposum neonatorum is a disease of the first few weeks of life, characterized by widespread, patchy hardening of the subcutaneous tissue, the etiology of which is unknown. Infants suffering from this illness are usually premature, exhibit subnormal temperature, apathy, poor feeding and inability to gain weight resulting in rapid malnutrition and dehydration, and terminating in death within a few weeks.

Pathologically, this disease is characterized by a foreign-body granuloma showing wide fibrous branching trabeculae, neutral fat crystals, numerous proliferating blood vessels, and infiltration by foreign-body giant cells, lymphocytes, and an occasional polymorphonuclear leucocyte.

Since this entity is uncommon and because of close observation of a patient with a prolonged clinical course, including post-mortem examination, we are reporting the following case.

CASE REPORT

History.—A white male infant was born Sept. 11, 1946, to a 35-year-old mother who had a history of eight previous pregnancies including one abortion at the third month of gestation. The present pregnancy was full term and complicated by mild pre-eclampsia. Birth was spontaneous and the amniotic fluid was meconium-tinged. The mother's Wassermann was negative.

Clinical Examination.—The infant weighed 11 lbs., 8 ozs., and measured 21.5 inches. Scalp ecchymosis and moderate signs of moulding with overriding of the parietal bones, as well as marked caput at the vertex were present. The anterior fontanelle was not bulging. Supra- and infrasternal retraction were noted. Breath sounds were vesicular and transmitted throughout; heart tones were of good quality without murmurs; cry and color were fair. Sixteen hours after birth, clonic seizures of facial and arm muscles were present. Vitamin K and calcium gluconate therapy were administered.

On the second day, facial tremors and moderate spasticity of all extremities with marked flexion of the left wrist were noted. Cyanosis and regurgitation were prevalent, but responded to oxygen inhalation and gavage. A 16 oz. weight loss was present since birth.

During the next few days, several new features developed, such as cephalic cry, thrush, and a hard, subcutaneous mass in the left arm. A clysis of Lactate-Ringer's solution was ordered and the monilia infection cleared rapidly with 1 per cent aqueous gentian violet applied topically. A scalp infection followed, with several areas of oozing. A dry gangrenous slough developed in the occipital area, despite 10,000 units of penicillin every three hours intramuscularly and a 60 c.c. transfusion of whole blood. A low-grade fever and cyanosis persisted, but feeding definitely improved.

On September 22, several firm, indurated, subcutaneous areas were noted on the cheeks, back, volar surfaces of arms, calves, and abdomen. The flexion deformity of the left wrist had decreased since application of splints and the scalp was healing rapidly. A blood count showed 20,000 white blood cells

From the Departments of Pediatrics and Pathology, Kings County Hospital (Kings County Division) G. C. Brockway, M.D. and C. G. Burn, M.D., Directors of Services.

The Social Aspects of Medicine

ON THE TAFT BILL

July 22, 1947

Dear Dr. Park,

Senate Bill 545, National Health Act of 1947, commonly called the "Taft Bill," was introduced in the Senate Feb. 10, 1947, and has been under discussion by many medical groups, both at the hearings in Washington and in various publications. The bill is evidently offered as a substitute for the Wagner Bill, a new draft of which was introduced in the Senate May 20, 1947. In comparing the two bills, one cannot fail to be impressed by the careful, logical treatment of the subject of medical care in the Wagner Bill and the inadequate and uncomprehending approach of the Taft Bill. The objection to the Wagner Bill on the part of those who do not support it, and I am one, is that it is dependent for its operation on compulsory health insurance. If it were not for this feature, the bill, with certain modifications, could be indorsed. Assuming sincerity of motive in the sponsors of the Taft Bill, does it present a satisfactory approach to the solution of the problem of improving medical care in this country without the objectionable feature of compulsory insurance? I do not think so, as it does not provide a plan which offers any likelihood of modifying medical care procedures so that the benefits of medical science may be available to all the people.

It is not necessary here to analyze the bill in detail; this has been done in publications of the American Medical Association, the American Public Health Association, The Physicians' Forum, and The Committee of Physicians for the Improvement of Medical Care. It may be worth while to point out some of the reasons why the Taft Bill is unsatisfactory.

The bill sets up the National Health Agency in the executive branch of the Government. The agency will take over the Public Health Service, The Children's Bureau, the Food and Drug Administration, and add two new Divisions, Medical and Hospital Care Services and Dental Care Services, and the Administrator, who is appointed by the President, with the advice and consent of the Senate. He must be a physician "outstanding in the field of medicine," but nothing is said about either his qualifications in administrative responsibility or his background in public health knowledge or practice. There are several fields from which an able administrator might be selected; private practice could produce such an individual, but it is not the most likely group in which to find him.

Already real progress has been made in the consolidation and coordination of the various health services of the Government under the Social Security Administration. This is a step toward bringing together health, education, and welfare into a department with its head a member of the cabinet. The Taft Bill scraps all this advance, and the proposed agency would have no cabinet representative but would report directly to the President. This is not in line with good administrative practice.

Title VII, Medical and Hospital Care Services, is the portion of the bill dealing directly with the problems of most interest to physicians. The administrator of these services must be a physician "who has had at least five years

Gm. per cent, 4.2 million red blood cells, hematocrit 36.5 per cent and plasma proteins 5.5 gm. per cent. Urinalysis revealed an acid reaction, albumin one plus, sugar negative, microscopic negative, and Sulkowitch test was positive for calcium.

Since vomiting persisted despite formula changes consisting of Sobee and thickened cereal feedings with and without atropine, a gastrointestinal series seemed advisable. The x-ray report follows:

"Fractional study of the gastrointestinal tract within a period of five hours shows no intrinsic lesion visible in the stomach or duodenum. A slight delay of gastric evacuation is noted within three hours. In five hours most of the barium is distributed in the lower portion of the small intestine with a small gastric residue."

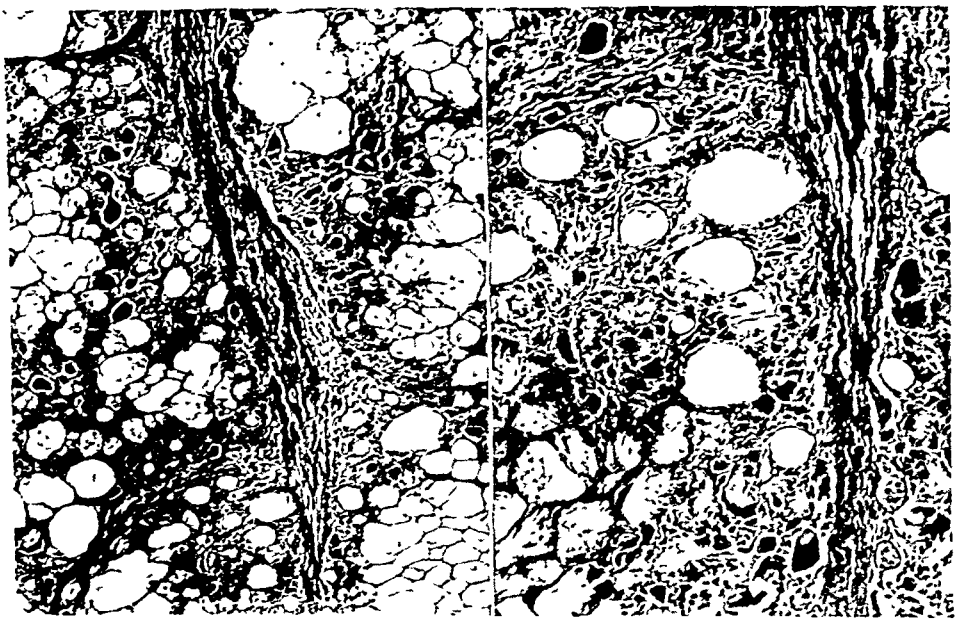


Fig. 2. Fig. 3.

Fig. 2.—Section through skin and subcutaneous tissue; stained with H. & E. (×100). Note thickening and branching of fibrous trabeculae and numerous foreign-body giant cells.
Fig. 3.—Same section as Fig. 2 with higher magnification (×440).

Vomiting and dehydration continued despite subcutaneous clyses and small blood and plasma transfusions. Diarrhea ensued, for which oral feedings were stopped and continuous intravenous fluids were given, including parenteral vitamin therapy. The diarrhea abated but a subnormal temperature occurred and was followed by coma and generalized fine inspiratory rales. A blood CO_2 combining power was 30 volumes per cent and urea 69 mg. per cent. The baby expired Nov. 14, 1946, sixty-four days following birth.

NECROPSY

At necropsy, twenty-one hours after death, the body was that of a white, 2-month-old male infant, measuring 22 inches and weighing approximately 12 lb. Several large, firm, subcutaneous, fibrotic patches were palpated, which were most marked on both cheeks, buttocks, thighs, right lower deltoid, flexion

provide a clean and safe supply of milk and infant food when breast feeding was not available. The earliest organized effort in Britain at child care for the very young dates from 1890 when the City of Manchester established a "welfare service" which provided for women with some elementary training in hygiene to call at the homes of mothers to help them in caring for their babies and teach them the rudiments of infant hygiene. A few years later Britain's first "Infant Milk Depot" was started. Here milk could be obtained which was free from dangerous germs.

The subsequent development of child welfare in Britain has followed these two main lines. Some of the earliest welfare clinics were called "Schools for Mothers," and mothers were encouraged to attend regularly for instruction, for the progress of their infants to be watched, and to have the child medically examined so that incipient disease could be detected before it became serious. At such clinics milk and milk-foods were available. Home visiting continued as an essential part of the scheme, but the training of those who undertook the visiting became more thorough and better organized. They are now known as "health visitors," and are not only trained as nurses but are given supplementary training in midwifery and child care.

Several great cities, and parts of London, had opened infant welfare clinics in the early years of this century. By 1910 it was estimated that there were ninety clinics in Great Britain, and by 1914 the number had grown to 400. Usually they were started and organized by voluntary effort, with the local health authority (that is, the health department of the town or county council) paying part of the cost and often the whole salary of the medical officer and the health visitors. A movement to bring to all mothers and babies the benefits of the scheme was also begun early in this century. It became law that every birth must be notified to the authorities within forty-eight hours of its taking place. At first this was an optional arrangement for any area to adopt. By 1915 it had become compulsory for the whole of Britain.

During the war of 1914-18, the child welfare movement grew fast, and by 1918 the British Government decided to make it a nationally organized scheme. The Maternity and Child Welfare Act passed by Parliament that year made it possible for every health authority to set up a welfare clinic scheme for all children under 5 years old. A yet further advance is provided by last year's National Health Services Act, which goes beyond financial and other encouragement by making it compulsory for every local authority to set up such a scheme.

For children of school age, the school health service takes over the work already begun with the baby. Today there are probably nearly 2,000 child welfare clinics all over Britain employing well over 1,000 doctors. The service also includes nurseries where healthy children can stay during the day when their mothers are at work, or for longer periods when their mothers are ill and cannot look after them themselves.

The school health service began in rather a different way from that concerned with infant welfare. Throughout the nineteenth century various voluntary bodies expanded the facilities available to the people for education of their children. In 1870 the Government took over this work and made it possible for every child in Britain between the ages of 5 and 14 to receive some education. Ten years later school attendance was made compulsory. It was at once found that conditions of undernutrition and ill-health prevented children from attending school regularly. In addition, children were often too ill and too hungry to make the most of their schooling, even when they were physically present in class.

The first step taken to remedy this state of affairs was the provision of meals at school for those who were underfed. The cost of these meals was re-

with or without discoloration or ulceration. This is a benign condition which usually resolves; occasionally calcification results.

Scleredema (infantile) or edema neonatorum, is a particular variety of edema in which the skin is very hard but exhibits pitting, and is not adherent to the underlying subcutaneous tissue. The parts involved are usually the feet, calves, outer thighs, but occasionally the genitals and palms and soles are affected. These latter sites are always spared in sclerema adiposum.

Biopsy conclusively establishes the diagnosis.

The etiology of sclerema adiposum neonatorum is unknown, although many theories have been proposed. The most widely accepted explanation is that a deficiency of unsaturated fat exists in the adipose tissue, thereby causing it to solidify at a higher temperature than is needed for normal fat. This results in a foreign-body reaction of the tissues.

Although the literature emphasizes the prevalence of this disease in premature infants with an extremely rapid course (two to three weeks); the above case, on the contrary, is that of a large baby with a protracted illness.

SUMMARY

A case of sclerema adiposum neonatorum is presented, including necropsy. The terminology, etiology and differential diagnosis is discussed. Unlike most cases, this patient was unusually large and pursued a prolonged clinical course.

REFERENCES

1. Zeep and Madden: Arch. Path. 41: 166, 1946.
2. Reich: Arch. Derm. & Syph. 45: 342, 1942.
3. Miller and Kritzler: Arch. Derm. & Syph. 47: 82, 1943.
4. Fox: Arch. Derm. & Syph. 27: 237, 1933.
5. Spain and Foley: Am. J. Path. 20: 783, 1944.
6. Wells: J. A. M. A. 114: 2177, 1940.
7. Brennerman: Text. Practice of Pediatrics 19: 1, 1947.
8. Holt and McIntosh: Text. Dis. of Infancy and Childhood 876: 11, 1939.

News and Notes

Dr. Russell J. Blattner of St. Louis has been appointed professor and chairman of the department of pediatrics at Baylor University Medical School, Houston, Texas. Dr. Blattner was formerly associate professor of pediatrics at the Washington University Medical School.

Dr. Sidney S Chipman of Norwalk, Conn., has been appointed associate professor of pediatrics at the Louisiana State University School of Medicine. Dr. Chipman will be director of the postgraduate extension program in pediatrics in Louisiana.

At a recent meeting of the **Louisiana State Pediatric Society** the following officers were elected for 1947-48: President, R. V. Platou; Vice president, W. C. Rivenbark; Treasurer, Jack E. Strange; Secretary, Bertha Wexler.

The **Queens Pediatric Society**, Long Island, N. Y., has been recently formed with the following officers: President, Dr Walter C A. Steffen; Secretary, Dr. Louis Appel; Treasurer, Dr. Meyeron Coe

Dr. Rood Taylor, formerly clinical associate professor of pediatrics at the University of Minnesota, died at his home in California in May. Dr. Taylor had retired a few years ago on account of his health.

The death of Dr. G. B. Cornick of San Antonio, Texas, in September has been reported.

The following have been certified in the sub specialty of allergy by the **American Board of Pediatrics**, in cooperation with the **Committee on Allergy of the American Board of Internal Medicine:**

Dr William C Deamer, University of California Hospital, San Francisco 22, Calif. (*Certified on record*).
Dr. Edward P. Duffy, Jr., 334 Washington Ave, Belleville 9, N. J.
Dr. Gertrude Felshin, 888 Park Ave., New York City 21, N. Y.
Dr Meryl M. Fenton, 10 Witherell (1212 Broderick Tower), Detroit 26, Mich.
Dr. Stanley S Freedman, 183 Waterman St, Providence, R. I.
Dr Dorothy M. Lang, 85 Old Mamaroneck Road, White Plains, N. Y.
Dr. Norman A. Pokorny, 23 Maple St, Springfield 3, Mass
Dr. Howard G. Rapaport, 7 West 96th St, New York City 25, N. Y.
Dr. Eli Y. Shorr, 650 Ocean Ave, Brooklyn, N. Y.
Dr. Richard Henry Todd, 1612 Eye Street, N. W., Washington 6, D. C.
Dr. Ethel M. Davis, 185 North Wabash Ave, Chicago 1, Ill.
Dr. Ben F. Feingold, 672 South Westlake Ave, Los Angeles, Calif.
Dr. Seymour Fisher (Lieut Colonel), Billings VA Hospital, Ft Benjamin, Harrison, Ind.
Dr. James Carney Overall, 700 Church (908 Bennie Dillon Building), Nashville 3, Tenn.
Dr. Louise A. Yeazell, University of California Hospital, San Francisco 22, Calif.

STUDY OF CONGENITAL MALFORMATION ASSOCIATED WITH MATERNAL INFECTION DURING EARLY PREGNANCY

A committee consisting of Dr. Stewart Clifford, Boston; Dr. Herbert C. Miller, Kansas City, Kan.; Dr. Clement A. Smith, Boston; Dr Joseph Warkany, Cincinnati; Dr. James



Fig 1—Tumor mass visualized during coughing spell Jaws separated by means of mouth gag

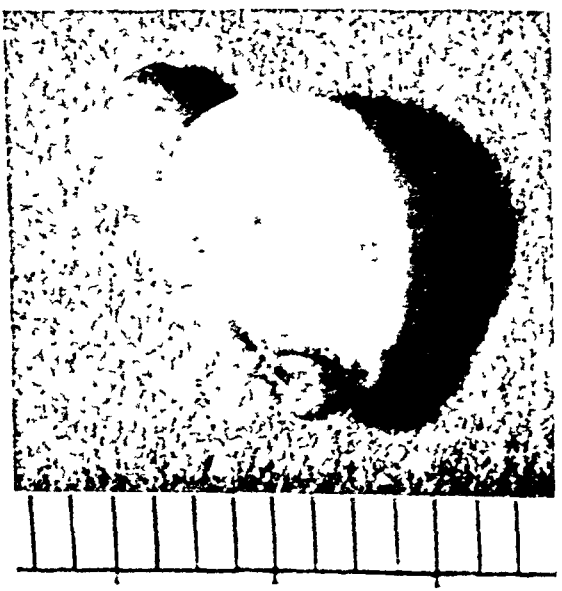


Fig 2—Appearance of mass shortly after removal by snare and electrocoagulation of base

Editor's Column

DISCRIMINATION IN MEDICINE

A GREAT deal has been said in recent years on the subject of discrimination against women and certain minority groups in medical education and practice. There has been discrimination against women in the past, but very little exists today. Recent statistics show that the opportunity for women to study medicine has almost doubled in the past three years. Eleven per cent of the entering class in 1946-47 were women. Of the seventy approved four-year course medical schools, and the nine two-year basic science schools, only four reported having no women in the entering class and one had only women.

While Negroes are excluded from medical schools in the South, the charge that they are banned from Northern schools is exaggerated, according to the recent report of the New York Academy of Medicine Committee on *Medicine in the Changing Order*. The difficulty lies in their limited opportunities for satisfactory high school and college education, rather than in discrimination by the medical schools. The American Board of Pediatrics certified Negro pediatricians on record when it was founded fourteen years ago and subsequently a number have passed their examination and been certified. It is true, however, that the number of hospital residencies available for Negro physicians for specialty training is limited. Efforts are being made to change this situation, as, for example, the assumption of responsibility for resident education at the Homer Phillips Hospital in St. Louis by the Washington University School of Medicine. The medical profession is in agreement on the need for more and better trained Negro physicians. While racial discrimination exists in a few schools, the real difficulty lies in the lack of opportunity for the Negro, particularly in the South, for the preliminary education which is a prerequisite for the study of medicine.

The chief complaint that is made regarding medical discrimination lies in the question of admitting Jews to the medical schools. For some reason or another there is seemingly a much larger percentage of Jews who have the desire to study medicine than their ratio to the total population. The medical schools in the United States could admit only 6,564 students in the first-year class for the year 1946-47 against some 8,000 to 9,000 who sought admission. Some schools have an unofficial quota system limiting the Jewish students to a certain percentage of the total. Some of the charges of discrimination, however, are not on a sound or factual basis. For example, the dean of a medical school in the Southwest stated to the writer a couple of years ago that his school had received more applications for admission from residents of New York City, most of whom had Jewish names, than there were places in their entering class. None were admitted. It was not because they were Jews but because this school is par-

polypoid mass about 1.5 cm. in diameter and attached by a pedicle to the base of the tongue in the midline, popping into the oral cavity (Fig. 1) upon gagging the patient. On palpation the mass felt firm in consistency.

During the period of hospitalization prior to surgery the infant did not manifest any obstructive symptoms. Several days after admission the tumor (Fig. 2) was removed by snare and electrocoagulation of base.

Macroscopically, the specimen consisted of well-encapsulated somewhat lobulated firm tissue. The nodule was light brownish gray in color and measured 1.5 x 1 x 0.8 cm. On section it appeared grayish white to pale yellow-gray.

On microscopic examination, numerous nests of mucus-secreting glands lying adjacent to dilated ducts were observed. These groups of mucous glands were widely separated by underlying bundles of smooth muscle fibers and small bands of fibrous connective tissue (Fig. 3). In the periphery of the nodule, a greater amount of fibrous connective tissue containing small bundles of smooth muscle fibers was found. The tissue adjacent to the mucous membrane which was composed of stratified squamous epithelium showed foci of lymphocytic infiltration particularly about the dilated capillaries in the papillary layer of submucosa (Fig. 4).

DISCUSSION

The tumor mass did not cause any respiratory embarrassment or difficulty in deglutition, even though its size was such that it could have blocked the glottic opening either partially or completely. It is interesting to note that the tumor was located in the midline, attached to the base of the tongue in the area of the foramen cecum. Under those conditions the anatomic relationship normally found would place the epiglottis between the tumor mass and the larynx with the epiglottis acting as a protecting shield, preventing the blocking of the laryngeal orifice. In this respect, the epiglottis has been aptly named by Jackson[6] as the "watchman of the larynx."

SUMMARY

An unusual glandular tumor of the tongue is reported. Although located at the base and attached near the foramen cecum, it did not cause any difficulty in deglutition or respiration. The anatomic relationship of the epiglottis to the tumor mass may be the possible explanation for the lack of symptoms.

Surgical removal of the tumor was performed by Dr. M. Cottle of the Ear, Nose and Throat Department. Gross specimen and microscopic sections examined by Dr. A. Ragins of Surgical Pathology.

REFERENCES

1. Leuw, K.: J. A. M. A. 83: 1957, 1924.
2. Whittier, L., and Dombrowsky, E. F.: J. PEDIAT. 29: 774, 1946.
3. Personal Observation.
4. Montgomery, M. L.: West. J. Surg. 43: 661, 1935; 44: 54. 122, 189, 237, 303, 1936.
5. Pattee, G. L.: Colorado Med. 32: 718, 1935.
6. Jackson, C., and Coates, G.: The Nose, Throat and Ear and Their Diseases, Philadelphia and London, 1930, W. B. Saunders Company, p. 738.

operate the seventy-nine medical schools for the year 1947-48, exclusive of the cost of maintaining the associated hospitals where the medical student receives so much of his training. Of this, the student fees will not provide over $12,000,000. Medical education, so far as the cost of the education of the student is concerned, is highly subsidized today, as $31,000,000, or 72 per cent, will come from grants or endowments.

We have no solution to offer, but simply present the facts. Compared with the total cost of medical care in the United States, or the 11½ to 14½ billions of dollars which is the estimated over-all cost of the Wagner-Murray-Dingell bill introduced in the last session of Congress, this sum needed for the education of physicians on whom ultimately the quality of medical care depends, is relatively small. Perhaps eventually we will have to adopt something like the Swedish system where a limited number of exceptionally intelligent young men and women, regardless of their economic status, are selected each year and given their medical education at state expense. It is a side of the picture that is seemingly unknown to or ignored by those who would solve the problem of medical care for all the people by some such simple formula as voluntary or compulsory methods of medical insurance or prepayment. Good medical care is fundamentally a question of medical education, and of adequate facilities in keeping with the developments of medical science. It is dependent on the knowledge and ability of the doctor, and this in turn on his education, rather than the method by which he is remunerated for his services.

B. S. V.

three times daily after meals. (It might be noted that the taste was apparently in no way objectionable and that the child did not even detect its presence.) After the administration of one gram of streptomycin, stool culture was found to be completely sterile, with no *Bacillus coli* and no Salmonella. Stools remained sterile and also odorless throughout the twenty days of treatment and for two days thereafter. During this time the stool was of soft consistency. On the third day after the administration of the streptomycin was stopped, *B. coli* began to appear in the cultures and all cultures taken every other day for a period of six weeks subsequently have shown a rich flora of *B. coli* and absent Salmonella.

Bacteriology.—Material for bacteriologic examination was obtained by swabbing the rectum with a sterile cotton applicator. In addition, during and after the administration of streptomycin, fresh specimens of stool were also collected.

The swabs were plated on SS and MacConkey agar plates and incubated for eighteen to twenty-four hours. Stool specimens were cultured in the Kauffmann's tetrathionate enrichment broth for eighteen hours and then subcultured on MacConkey agar plates. Colorless colonies from SS or MacConkey agar were subcultured into liquid sugar media and examined for motility and indole production. A twenty-four-hour broth culture grown at room temperature was used for serologic tests. The organism was identified by specific O and H sera as *Salmonella newport*. We are indebted to Dr. E. Seligmann of the National Salmonella Center of New York for these sera. On two occasions cultures of the organism were sent to Dr. Seligmann and the presence of *Salmonella newport* was confirmed by him.

COMMENT

Inasmuch as the organism was always present, even after the administration of the sulfadiazine and later sulfasuxidine, although there was clinical improvement after the latter, we do not feel that the sulfasuxidine exerted any beneficial effect on the course of the disease. We rather feel that the acute phase had coincidentally ended and that the disease had entered the carrier phase. The prompt sterilization of the stool after the administration of the oral streptomycin, however, cannot, in our opinion, be a mere coincidence. The streptomycin was given orally in order to obtain local action in the bowel. It is known that this antibiotic is not appreciably absorbed from the gastrointestinal tract and hence large doses could be given without fear of toxicity. While this paper was being prepared for publication, Seligmann and associates* reported a complete failure of elimination of *Salmonella typhimurium* from the stool of a series of cases of infants. It might be important, therefore, to point out the differences between their series and our case. Seligmann and co-workers were dealing with the acute stage of the infection, while we were treating a carrier. Furthermore, they were using much smaller doses and over a shorter period of time. Although we make no pretense to draw conclusions from a cure in one case we feel that it is worth reporting, since it seems to point the way to an efficient treatment of Salmonella carriers.

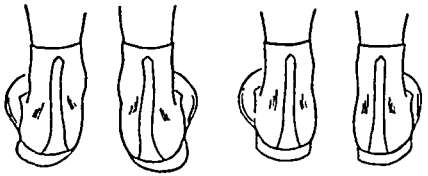
SUMMARY

An infant in the carrier state of Salmonella infection was successfully treated with streptomycin administered in large doses orally over a prolonged period of time.

We are extremely grateful to the Charles Pfizer Co., through whose kindness the streptomycin was supplied.

*Erich Seligmann, M.D., Louis Baraff, M.D., and Sidney Cohlan, M.D. Streptomycin Treatment of Salmonella Enteritis in Infants, J. PEDIAT. 30: 182, 1947.

Helping to correct *Pronation*



Stride-Rite recognizes the problems of pronation to the extent that it builds a special shoe for this purpose alone. An eighth inch wedge is built in on the inner border of all heels as a corrective measure. This is done at the factory with the quality and precision for which Stride-Rite is recognized, providing a solid foundation for any further adjustment.

THE STRIDE RITE SHOE

FROM TOTS TO TEENS



GREEN SHOE MFG. CO., BOSTON, MASS.

The George Washington University School of Medicine

ANNOUNCES

THIRD ANNUAL SERIES OF INTENSIVE POSTGRADUATE COURSES

Infectious Diseases . . . . . March 15-19, 1948
Newborn and Premature . . . . March 22-26, 1948

A DISTINGUISHED GUEST FACULTY WILL SUPPLEMENT THE LOCAL STAFF

Numerous other courses are also available. Registration in each course is limited. Veterans can use their benefits under the G. I. Bill of Rights. Hotel accommodations are available. For further details write:

Director of Postgraduate Instruction
THE GEORGE WASHINGTON UNIVERSITY
SCHOOL OF MEDICINE
1335 H Street, N. W., Washington 5, D. C.

of active medical practice." Again it should be pointed out that this in no way guarantees the appointment of a person with administrative ability and vision. It smacks of control by organized medicine and a stand-pat outlook.

Nowhere is there any provision at the Federal level to assure quality of the services rendered. It is fantastic to pass out money from the Federal Treasury without any assurance that there is even a reasonable chance that it will not be wasted. A provision safeguarding quality of service need not carry with it bureaucratic control of details nor dictation with respect to appointments of personnel. Failure to include such a provision invites waste and incompetence.

The advisory council is too heavily weighted with medical personnel and the general public too scantily represented. The provision that the advisory council can override the administrator in approval of State plans is not good administrative practice.

Another fault in the bill is its coverage. It is stated that the design is to assist "families and individuals of low income;" no statement of whom this includes is given and no provision is made for the families of moderate means, who need assistance most of all. Those who receive medical care on a charity basis fare very well at the present time; it is the families above that economic level who want good medical care but are unable to bear the costs without some assistance from the Government. The bill does not meet their need. The application of the means test is cumbersome and very difficult; even at the local level, where some workable plan might be devised, the bill does not provide the answer. Appropriations to meet the costs of service, after the first five years will be granted from year to year according to the whim of the Congress, and the "low income" group might easily fall lower and lower. There is no assurance of stability in the plan.

Altogether, the bill fails to present a carefully conceived or intelligently planned national health service. Surely something better than this can be provided; if not, then compulsory insurance along the lines proposed in the Wagner-Murray Bill will surely be enacted.

RICHARD M. SMITH, M.D.

CHILD WELFARE IN BRITAIN

ALAN MONCRIEFF, F.R.C.P.*
LONDON, ENG.

Just over a hundred years ago the public conscience in Great Britain began to be stirred about matters of health. Several national epidemics, cholera for example, had given rise to great alarm. Experienced medical practitioners attributed such epidemics to the deplorable conditions under which many of the poor in great cities lived and worked. A special Act of Parliament in 1836 set up a system for registering the exact cause of all deaths. Three years later, a doctor began a series of annual reports on the nation's health, based for the first time upon accurate facts and figures.

A study of these reports soon revealed that the annual death roll was appallingly high among babies and women in childbirth. Important steps were taken to improve the midwifery services, and the later years of the Nineteenth Century saw also the beginning of organized efforts to deal with disease and death among infants and young children.

Two main causes of child deaths were obvious, ignorance and dirt. The remedies were to educate mothers in the management of their babies, and to

*Director of the Institute of Child Health; Nuffield Professor of Child Health, University of London.

A broadcast over BBC.

MODERN PSYCHIATRY

by William S. Sadler

M.D., F.A.P.A.

Consultant Psychiatrist to Columbus Hospital; Consultant in Psychiatry, The W. K. Kellogg Foundation; Fellow of the American Psychiatric Association; Member of the American Psychopathologic Association.

896 pages. Price, cloth, $10.00.

CONTENTS

INTRODUCTION: Psychosomatic Medicine

PERSONALITY PROBLEMS: What Is Personality? Classifications of Personality. Unification of Personality. Maladjustment of Personality. Personality Mechanisms. Reality Relationships. The Subconscious. The Preschool Child. The School Child. The Adolescent Personality. The Adult Personality. Family Life. Constitutional Inadequacy. The Psychopathic Personality. General Psychopathology. Etiology. Symptomatology. Classifications. Diagnosis and Prognosis. The Examination.

THE PSYCHONEUROSES: Psychoneuroses in General. Psychasthenia and Neurasthenia. Special Phobias. Compulsions — Obsessions. The Inferiority Complex. Mood Swings — Mild Depressions. Nervous Exhaustion — Fatigue Neuroses. Anxiety States. Sexual Problems. Hypochondria. Hysteria. Episodic Hysteria. Borderland Hysterias. Sundry Functional Nervous Disorders. War Neuroses.

THE PSYCHOSES: The Psychoses as a Class. Emotional Reaction Types. Involution Melancholia. Schizophrenic Reaction Types. Paranoic Reaction Types. Defective Reaction Types. Toxic Reaction Types. General Treatment of the Psychoses. Shock and Convulsive Therapy.

GENERAL PSYCHOTHERAPEUTICS: General Management of Mental and Nervous Disorders. Suggestion and Hypnotism. Psychiatry and Psychiatrists. Catharsis — Ventilation. Re-Education — Retraining. Remotivation. Sublimation and Fear Management. Will Power and Decision. Habit and Self-Control. Play and Recreation. Rest and Relaxation. Socialization. Philosophy and Religion. Occupational Therapy. Therapeutic Reading and Study. Physical and Medicinal Treatment.

Schools of Psychiatry. Bibliography. Glossary.

In "Modern Psychiatry" the author briefly tells the story of personology—the difficulties human beings have in adjusting themselves to life. This word, personology, is not in the dictionary, but it should be. We have an "ology" for the mind, for the body, for social relations, for religion, and so on; but we have been so much interested during the past hundred years in dissecting and analyzing that we are only just getting around to realizing the importance of synthesis—of putting all these things together and studying them as wholes.

In this work the author places before practitioners of medicine, as well as before specialists and psychiatrists, the problems of personality maladjustment, the psychoneuroses, and the psychoses. It is the purpose of this book to serve as a ready and compact reference book for diagnosis and immediate treatment.

The C. V. MOSBY COMPANY MJ
3207 Washington Blvd., St. Louis 3, Mo.

Send me a copy of Sadler's MODERN PSYCHIATRY. The price is $10.00.

☐ Attached is my check. ☐ Charge my account.

Dr._____

Address_____

covered from the parents if they could afford it, or paid for by the local authorities if the parents were too poor. At a later date milk was made available at school for all children who wanted it and today a very high proportion of children in Britain drink a glass of milk at school each day.

In 1907 it became obligatory for all who supervised the schooling of children up to the age of 14 to arrange for the regular medical inspection of the children. If defects were discovered treatment had to be given. But doctors and hospitals could not easily cope with this work, and so special clinics were set up to deal with such matters as verminous skins, infested hair, sores, running eyes, and similar troubles. Here "school nurses" worked under the supervision of special medical officers. By 1918 it became a duty of this school health service to provide treatment for defects of vision, for infected tonsils, and for diseased teeth.

Under Britain's new Education Act of 1945, the local education authorities must now provide a comprehensive health and treatment service for all school children, even for those who will go to the newly organized "young peoples colleges." Special schools and classes must be available for those who are handicapped physically or mentally. In this way schools have been established for the deaf, for the blind, for the crippled, and for those with heart or other diseases, as well as special clinics for psychologic disturbances and for speech training. It is estimated that before the last war there were over 1,500 British doctors engaged in school health work, of whom 266 worked full time in the school health service, and over 900 worked full time in school health work and child welfare work.

It should be noted that apart from health visitors going to the homes of the mothers and occasional calls by the school nurse, there was until last year no official provision for treatment of sick babies, either at home or in hospital. This was carried out either by private doctors, by voluntary hospitals financed by charitable subscriptions or by the larger municipal and county authorities. Under the new Health Act, free medical and hospital treatment becomes available for all who want it. It should be possible, therefore, to extend the service now given by the infant welfare clinics and the school health organization to cover every aspect of the care of the child in sickness and in health. Coordination between the services dealing with the prevention and with the cure of disease will be necessary, and it is already being achieved in some areas. British universities are giving recognition to this matter in which the education of doctors, nurses, and the public is so important, by setting up Institutes of Child Health. Through these, hospitals and the local authority's preventive services can meet on common ground and develop satisfactory policies of mutual aid.

Finally, let me stress that education is the main theme of all this work. Education of the mothers was the first aim of the infant welfare movement. The school health service came into being because poor health was interfering with children's education. The Universities have given recognition, perhaps belatedly, to the educative side of all this work for the child, and it is through education of all concerned that Britain can look forward to still further improvements in the national health.

Articles to appear in early issues of

The JOURNAL OF PEDIATRICS

ALLERGY AS A CAUSATIVE FACTOR OF FATIGUE, IRRITABILITY, AND BEHAVIOR PROBLEMS OF CHILDREN.
By Theron G. Randolph, M.D., Chicago, Ill.

PHTHALYLSULFATHIAZOLE IN THE TREATMENT OF DIARRHEA IN CHILDREN.
By Maurice L. Blatt, M.D., Edward B. Plattner, M.D., Milton Levine, Ph.D., and Franreska Melzer, M.S., Chicago, Ill.

PREMATURE CLOSURE OF THE CRANIAL SUTURES.
By Donald R. Simmons, M.D., and William T. Peyton, M.D., Minneapolis, Minn.

BLOOD VOLUME IN CONGENITAL HEART DISEASE.
By Donald E. Cassels, M.D., and Minerva Morse, Ph.D., Chicago, Ill.

DELAYED EXHIBITION OF ERYTHROBLASTOSIS FETALIS AFTER EIGHT NORMAL PREGNANCIES.
By Thomas L. Perry, M.D., New York, N. Y.

FEBRILE CONVULSIONS: A CLINICAL STUDY WITH SPECIAL REFERENCE TO HEREDITY AND PROGNOSIS.
By Samuel Livingston, M.D., Edward M. Bridge, M.D., Laslo Kajdi, M.D., Baltimore, Md.

PROLONGED ANURIA FOLLOWING A SINGLE INJECTION OF A BISMUTH PREPARATION.
By Carl L. Petersilge, M.D., Cleveland, Ohio.

COMPARATIVE ABSORPTION, EXCRETION, AND STORAGE OF OILY AND AQUEOUS PREPARATIONS OF VITAMIN A.
By J. M. Lewis, M.D., O. Bodansky, M.D., J. Birmingham, M.D., and S. Q. Cohlan, M.D., New York, N Y.

PERTUSSIS-PARAPERTUSSIS VACCINE.
By Alwin C. Rambar, M.D., and Katherine Howell, M.D., Chicago, Ill., and Edward J. Denenholz, M.D., Modesto, Calif.

FRIEDLÄNDER'S PNEUMONIA IN INFANCY.
By Bertram W. Miller, M.D., Harry W. Orris, M.D., and Harold H. Taus, M.D., New York, N. Y.

THE CLINICAL PICTURE OF MUMPS MENINGOENCEPHALITIS AND REPORT OF A CASE WITHOUT PAROTITIS.
By First Lieutenant Walter R. Eberlein, Medical Corps, Army of the United States, and First Lieutenant Chester P. Lynxwiler, Medical Corps, Army of the United States.

ACRODYNIA—A NEW TREATMENT WITH BAL.
By Lee Bivings, M.D., and George Lewis, Ph.D., Atlanta, Ga.

THE TREATMENT OF PERTUSSIS AND PNEUMONIA COMPLICATING PERTUSSIS.
By Henry Brainerd, M.D., San Francisco, Calif.

BODY SIZE AND GROWTH RATE OF CHILDREN WITH DIABETES MELLITUS.
By Carolyn K. Beal, M.A., Iowa City, Iowa.

SEPTICEMIA DUE TO ESCHERICHIA COLI: REPORT OF TWO CASES.
By R. David Daniel, M.D., and Katherine Anderson, M.D., Boston, Mass.

CONGENITAL HEMOLYTIC ICTERUS, FOUR GENERATIONS.
By Charles Hageage, M.D., and Joseph Horgan, M.D., F.A.C.S., Washington, D. C.

CARBAMINOYCHOLINE (DORYL) IN THE TREATMENT OF CONGENITAL MEGACOLON.
By Jacob Greenblatt, M.D., Stamford, Conn.

Wilson, Ann Arbor; and Dr. Herman Yannet, Southbury, Conn., has been formed, with the financial support of the National Society for the Prevention of Blindness, to obtain information and study the relationship between congenital malformation and infections of of the mother during early pregnancy. While the relationship between German measles and congenital malformation in the fetus has been established, there is little known as to its incidence and frequency of escape. Further, very little is known as to the effect of other contagious diseases contracted by the mother in the first trimester. A questionnaire has been prepared which will be sent early in September of this year to qualified pediatricians, obstetricians, and ophthalmologists requesting information in regard to the health and status of the child, when there has been maternal infection during the first trimester of pregnancy. The assistance and cooperation of physicians with knowledge and information of children with or without congenital defects, where the mother has had an infectious disease as German measles, mumps, chickenpox, is requested by the committee. Physicians not receiving a questionnaire can obtain them by writing Dr. Herbert C. Miller, University of Kansas School of Medicine, Kansas City, Kansas.

Book Reviews

Feeding and Care of Baby. Sir F. Truby King, C. M. G., M.B., B.Sc., revised 1942, published in U.S.A., New York, 1947, Oxford University Press, 257 pages, 48 illustrations, paper covered. Price $1.75.

This book had its first edition in 1913. It has had many revisions and reprintings. It was prepared for the use of mothers of New Zealand, but also it is the official textbook of Truby King Mothercraft Societies throughout the world. The coverage of the text includes the following: preparation for baby, routine management of baby, natural feeding, artificial feeding, management and feeding of the preschool child, care of baby's teeth, the premature baby, management of various ailments.

Editing of the book seems to be under the auspices of the Royal New Zealand Society for the Health of Women and Children, Inc. Instruction of mothers by means of the book and of nurses seems to be under the auspices of the Plunket Society. These relationships are not clear from the book. The Plunket Society was formed thirty-three years ago as a result of the recognition by King of the urgent necessity for vigorous measures to combat high infant mortality. Its chief aim was and is encouragement of breast feeding. For those babies who must be fed artificially the "percentage feeding method" that was currently in use in the United States at the time of founding of the society was adopted. The same method of feeding has been continued and is the one advocated in the book. The formulas advised for use in early infancy are designated as humanised milk. The milk mixture contains cod liver oil. Orange juice is given early, but in minimum amounts. It is advised that no other food be given before 6 months of age. These feeding practices differ from those that predominate in the United States at the present time, although certain proprietary foods intended to simulate human milk are in use. The book condemns cow's milk dilution formulas (milk, water, and sugar) as not being adapted for ensuring proper bone, muscle and stamina.

The book contains much useful advice on the rearing of infants and young children. In general, the advice is similar to that which is customary in this country. One fairly radical departure is ot be noted, namely, the amount of ventilation advised. "At the Truby King Harris Hospital the babies live out of doors all day, and a broad stream of pure, cold, outside air flows through the sleeping rooms all night long. Babies, after a week or more of gradual habituation, sleep well, grow, and flourish in rooms where the temperature may sometimes fall almost to freezing point. Of course the babies are properly clothed and covered."

P. C. J.

THE JOURNAL OF PEDIATRICS

EDITOR

BORDEN S. VEEDER, M.D., 3720 Washington Blvd., St. Louis 8, Mo.

PUBLISHED BY THE C. V. MOSBY COMPANY, 3207 WASHINGTON BLVD.
ST. LOUIS 3, U. S. A.

Entered at the Post Office at St. Louis, Mo., as Second Class Matter.

Published Monthly, Subscriptions may begin at any time.

Editorial Communications

Original Communications.—Manuscripts for publication and correspondence relating to them should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo., U. S. A. Articles are accepted for publication upon the understanding that they are contributed solely to The Journal of Pediatrics.

Articles and Comments for the Department, The Social Aspects of Medicine.—All material for this section should be sent to Dr. Edwards A. Park, The Johns Hopkins Hospital, Baltimore 5, Md., U. S. A.

Manuscripts should be typewritten on one side of the paper only, with double spacing, and liberal margins. References should be placed at the end of the article and should include, in the order given, name of author, journal, volume, page and year; e.g., Smith: J. Pediat. 1: 10, 1932. Journal abbreviations as used in the publications of the American Medical Association should be followed. Illustrations accompanying manuscripts should be numbered, provided with suitable legends, and marked on margin or back with author's name. Articles accepted for publication are subject to editorial revision.

Neither the editors nor the publishers accept responsibility for the views and statements of authors as published in their "Original Communications."

Illustrations.—A reasonable number of half-tone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editor for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered only in India ink, or black typewriter ribbon (when the typewriter is used), as ordinary blue ink or colors will not reproduce. Only good photographic prints or drawings should be supplied for half-tone work.

Books for Review.—Only such books as are considered of interest and value to subscribers will be reviewed, and no published acknowledgment of books received will be made. These should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo.

Reprints.—Reprints of articles published among "Original Communications," must be ordered specifically, in separate communication to the publishers, The C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, U. S. A., who will send their schedule of prices. Individual reprints of an article must be obtained through the author.

Business Communications

Business Communications.—All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.

Subscription Rates.—Single copies, 75c. In the United States and other countries of the U. S. Postal Zone, $8.50 per year in advance. In Canada and other foreign countries $9.50.

Remittances.—Remittances for subscriptions should be made by check, draft, post-office or express money order, or registered letter, payable to the publishers, The C. V. Mosby Co.

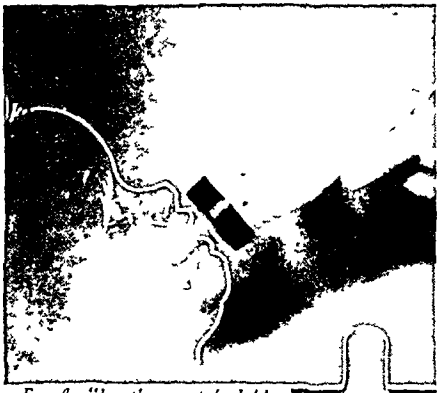
Change of Address.—The publishers should be advised of change of subscriber's address about fifteen days before the date of issue, with both new and old addresses given.

Advertisements.—Only articles of known scientific value will be given space. Forms close tenth of month preceding date of issue. Advertising rates and page sizes on application.

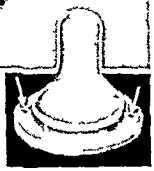
ticularly interested in turning out doctors who, the chances are, will remain to practice in the state, and not return to the Eastern metropolitan areas. In this school only a few nonresident students were admitted to the 1946-47 entering class, and in another school in the same state the entire entering class were residents of the state. The turning down of nonresident Jewish students by such schools is not based on racial discrimination. In our own field there is no discrimination against Jewish physicians as regards certification, and our societies freely admit them on the same basis as any one else—the basis of individual character, attainments, and ability. Such racial discrimination as exists, while of importance to the individual, does not affect medicine in any way. Our medical schools are filled to capacity, and more Negro or Jewish students would not increase the number or caliber of physicians.

There is, however, a discrimination which is most important, and which has the potentialities of seriously influencing medicine to its detriment in the future. The discrimination is economic. A man or woman enfering on the study of medicine today must have a sound financial backing for at least eight years—three of college, four of medical school, and one of interneship—after completing his high school education. Roughly, he must be completely supported from his seventeenth to twenty-fifth year. The scholastic load is so heavy today in the medical school that it demands the entire time of the student, and there is no time available to help meet expenses by outside work. Tuition alone in twenty-four of the seventy-nine medical schools is $600 a year or more, and in sixteen between $500 and $599. In thirty-five it is under $400 a year, but a number of these are state universities and in some an additional fee is charged to nonresidents. With the present cost of rooms, food. clothing, texts, etc., it is obvious that the medical student must have a minimum backing of $2,000 a year for the four years of his medical school course, to say nothing of the three college premedical years. Temporarily, the situation is eased by some 55 per cent of the 24,000 medical students in the United States being veterans and receiving financial aid from the government for their education. This is only a temporary situation. The study of medicine is thus restricted to children of families in the higher income brackets. The number of scholarships to help deserving students meet the cost of their medical education is pitifully small. To go through medical school successfully, an individual today must have an I. Q. of 125 and some place it at 135. Such I. Q's are by no means confined to the higher income brackets. Many a brilliant young mind gives up the thought of medicine as a career because of the impossibility of meeting the cost of the education. Medicine loses by this and in the long run the public will lose. This economic discrimination is a definite factor in the growth of cults with low educational standards, and in the increasing maldistribution of physicians who avoid the rural areas where the economic, educational, and social aspects of the doctor's life are not attractive nor commensurate with the cost of his education. Medical insurance will do little to change this situation.

Can the cost of medical education to the individual be reduced without lowering standards? It hardly seems possible when it will need $43,000,000 to



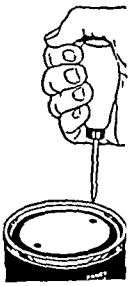
Evenflo "breathes as it feeds!"



Evenflo air valves relieve vacuum, prevent collapse.

Importance of Bubbles

You hear a humming sound when baby is fed with an Evenflo Nurser. The humming comes from air bubbles entering bottle thru Evenflo's patented Twin Valve Nipple. This air relieves the vacuum caused by the withdrawal of food. It puts the same air pressure inside bottle as outside, thus preventing nipple collapse. Milk flows evenly when nursed. This smooth nursing action is why babies finish their Evenflo *bottles easier and better.*



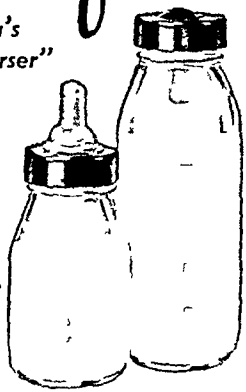
Extra Air Hole Provides Even Flow.

Complete Evenflo Nursing Units, 4 or 8 oz. size, are 25c at baby shops, drug and dept. stores.

Evenflo

"America's Most Popular Nurser"

—breathes as it feeds!



New 4 Oz. Hospital Size

Complete Unit—
Nipple, Bottle, Cap All-in-one, 25c

A true Castile Soap you can recommend with confidence



For over 30 years Stork Castile has been recognized and recommended by members of the medical profession as a pure, mild soap made especially for babies.

Now Stork Castile is *enriched* with skin-soothing Lanolin to help sensitive infant skin retain its natural lubrication.

Note: Samples of two new companion products, Stork Baby Oil and Stork Baby Powder, are available upon request to Stork Baby Products, 1351 West 31st Street, Chicago, 9, Illinois.

STORK Castile Soap

MADE ESPECIALLY FOR BABIES

Some day in the future

a dentist is going to talk about the teeth of the babies now under your care

HE WILL BE SOMEONE ENGAGED IN RESEARCH who will have made a study of the incidence of tooth decay among the boys and girls of that day.

What will he say? Aren't there good reasons for expecting him to say something like this: "The incidence of caries was found to be substantially lower than it was for comparable age groups 15 years ago. In evaluating the factors that contributed to this improvement, it is significant that at the time the subjects of the current study were infants, physicians generally were prescribing milks fortified with vitamin D."

We think so, and for these reasons:

1. Vitamin D is an essential nutrient in the development and maintenance of teeth.

2. Milk containing 400 units of vitamin D per quart helps prevent or arrest tooth decay when given in ample amount in an otherwise adequate diet.

3. Through the widespread use of vitamin D milk the vitamin D requirements of infants and children are being provided as never before and to a greater extent than in any other way.

Pet Milk, fortified with 400 units of pure crystalline vitamin D_3 per quart (half Pet—half water) prescribed extensively for infant feeding, is making a noteworthy contribution to the development and maintenance of sound teeth.

PET MILK COMPANY, 1437-J ARCADE BUILDING, ST. LOUIS 1, MO.



You Should Subscribe Now for These Special Journals

American Journal of Obstetrics and Gynecology

Representing The American Gynecological Society, The American Association of Obstetricians, Gynecologists and Abdominal Surgeons, and nine other societies. Editor: Geo. W. Kosmak, M.D.; Associate Editors: Howard C. Taylor, Jr., M.D., and Wm. J. Dieckmann, M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $12.00; Canada, and other Foreign Countries, $13.00 a year.

The Journal of Pediatrics

Borden S. Veeder, M.D., Editor.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

The Journal of Laboratory and Clinical Medicine

Carl V. Moore, M.D., Editor. Associate Editors: W. C. MacCarty, M.D.; T. B. Magath, M.D.; Victor C. Myers, Ph.D.; Edward Muntwyler, Ph.D.; George Herrmann, M.D.; Clifford J. Barborka, M.D.; Russell L. Haden, M.D.; John A. Kolmer, M.D.; M. H. Soule, Sc.D.; Paul R. Cannon, M.D.; Arnold D. Welch, Ph.D., M.D.; Frederick J. Stare, M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

American Journal of Syphilis, Gonorrhea and Venereal Diseases

J. E. Moore, M.D., Editor. Frank W. Reynolds, M.D., Associate Editor. Advisory Editorial Board: A. M. Chesney, M.D.; C. W. Clarke, M.D.; R. D. Herrold, M.D.; E. L. Keyes, M.D.; P. A. O'Leary, M.D.; T. Parran, M.D.; P. S. Pelouze, M.D.; J. H. Stokes, M.D.; R. A. Vonderlehr, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

The Journal of Thoracic Surgery

Representing The American Association for Thoracic Surgery. E. A. Graham, M.D., Editor; Brian Blades, M.D., and Richard H. Mead, Jr., M.D., Associate Editors.

Advisory Editorial Board: John Alexander, M.D.; Edward Wm. Archibald, M.D.; Edward D. Churchill, M.D.; Leo Eloesser, M.D.; Stuart W. Harrington, M.D.; Howard Lilienthal, M.D.; Rudolph Matas, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $10.50 a year.

American Heart Journal

A Journal for the study of circulation. Published monthly under the editorial direction of The American Heart Association. Editor-in-Chief, Thomas M. McMillan, M.D.; Associate Editors: Wallace M. Yater, M.D., Samuel Bellet, M.D., Louis Laplace, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $11.00 a year.

The Journal of Allergy

Official Organ of The American Academy of Allergy. H. L. Alexander, M.D., Editor. Editorial Board: J. H. Black, M.D.; M. B. Cohen, M.D.; R. A. Cooke, M.D.; S. M. Feinberg, M.D.; S. B. Hooker, M.D.; F. M. Rackemann, M.D.; M. B. Sulzberger, M.D.; L. Tuft, M.D.; M. Walzer, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

Surgery

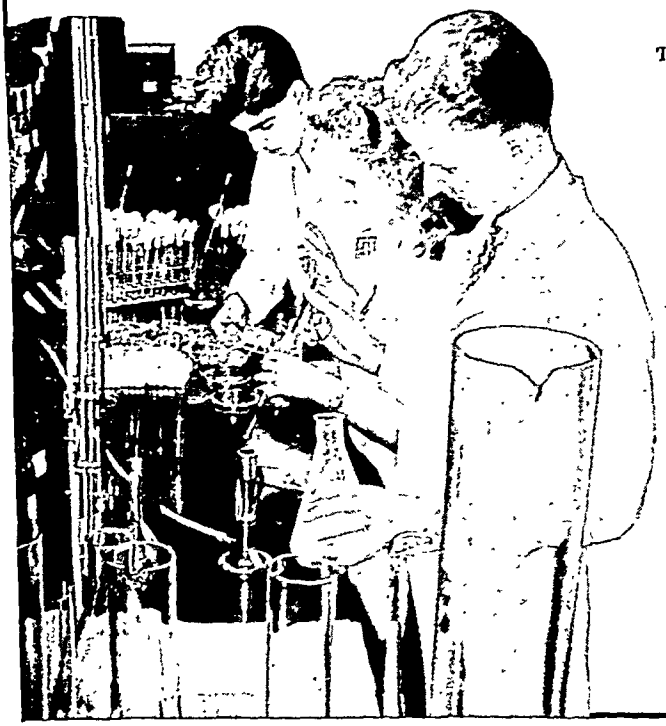
Alton Ochsner, M.D., and Owen H. Wangensteen, M.D., Editors. Alfred Blalock, M.D., Associate Editor. Published monthly. Subscription rates: Domestic, $10; Canada, and other Foreign Countries, $11 a year.

☞ **Enter your subscriptions to these important special journals today. If you prefer we shall be glad to send a sample copy.**

THE C. V. MOSBY COMPANY — *Publishers* — St. Louis

PURE VITAMINS

—Products of Merck Research



Thiamine Hydrochloride U.S.P.
(Vitamin B_1 Hydrochloride)

Riboflavin U.S.P.
(Vitamin B_2)

Niacin
(Nicotinic Acid U.S.P.)

Niacinamide
(Nicotinamide U.S.P.)

Pyridoxine Hydrochloride
(Vitamin B_6 Hydrochloride)

Calcium Pantothenate
Dextrorotatory

Ascorbic Acid U.S.P.
(Vitamin C)

Vitamin K_1
(2-Methyl-3-Phytyl-1,4-Naphthoquinone)

Menadione U.S.P.
(2-Methyl-1,4-Naphthoquinone)
(Vitamin K Active)

Alpha-Tocopherol
(Vitamin E)

Alpha-Tocopherol Acetate

Biotin

Merck research has been directly responsible for many important contributions to the synthesis, development, and large-scale production of individual vitamin factors in pure form.

In a number of instances, the pure vitamins may be considered to be products of Merck research. Several were originally synthesized in The Merck Research Laboratories, and others have been synthesized by Merck chemists and collaborators in associated laboratories.

Because most of the known vitamins have now been made available in pure form, effective therapy of specific vitamin deficiencies can be conducted on a rational and controlled basis, under the direction of the physician.

MERCK VITAMINS

MERCK & CO., Inc. RAHWAY, NEW JERSEY

Manufacturing Chemists

MERCK MERCK MERCK

New! AN ENGLISH BOOK

For American Distribution

DISEASES of CHILDREN'S EYES

by JAMES HAMILTON DOGGART, Ophthalmic Surgeon, Hospital for Sick Children, Great Ormond Street, London; Surgeon and late Research Scholar, Royal London Ophthalmic Hospital.

288 pages, 210 illustrations, including 32 color plates. PRICE, $10.00.

After giving some sound, sensible advice about the care and examination of children's eyes, this new book gives a section of anatomy of the orbit, then discusses the eyeball, the eyelids, conjunctiva, etc. Excellent illustrations appear in these sections.

Separate chapters are written on the Visual Pathway; Development of the Eye; Congenital Abnormalities; Ocular Complications. Then treatment is taken up; with separate sections on injuries of the eyeball; diseases of the orbit; refraction; squint; lacrimal disorders; and the varied diseases associated with the eye. Every chapter is well illustrated, with both black and white and colored illustrations appearing in profusion.

This book will have a strong appeal if you are an Ophthalmologist, a Pediatrician or General Practitioner—for after all, it is the General Practitioner who is first consulted in children's cases.

Use Coupon to Order

THE C. V. MOSBY COMPANY
3207 Washington Blvd.
St. Louis 3, Missouri

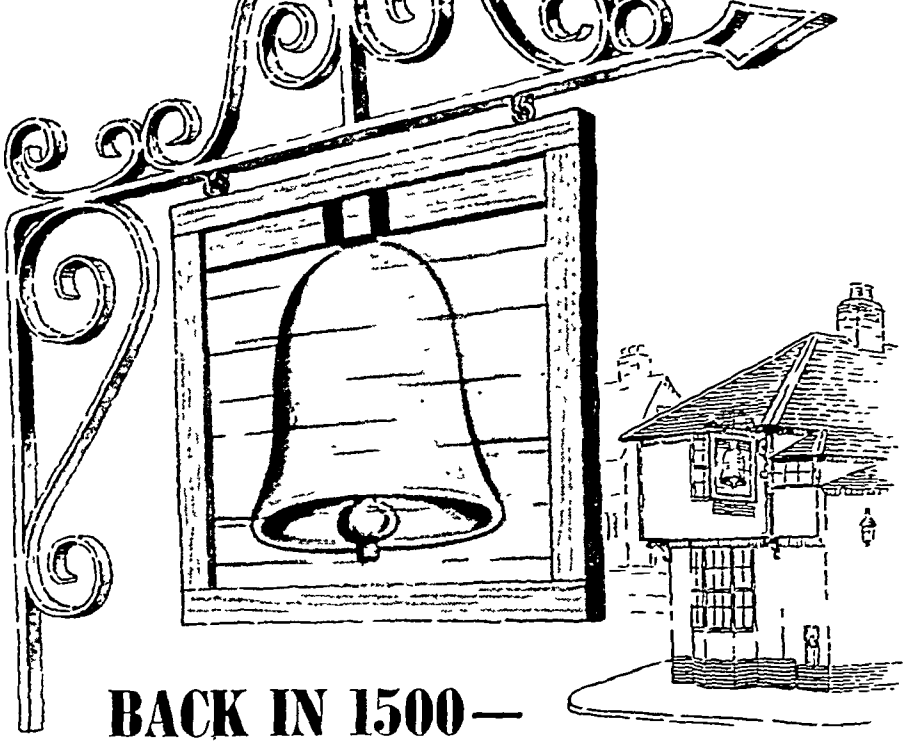
MJ-9/47

Gentlemen: Please send me a copy of Doggart's DISEASES OF CHILDREN'S EYES. The Price is $10.00

_____ Enclosed is check. _____ Charge my account

Name _____

Address _____



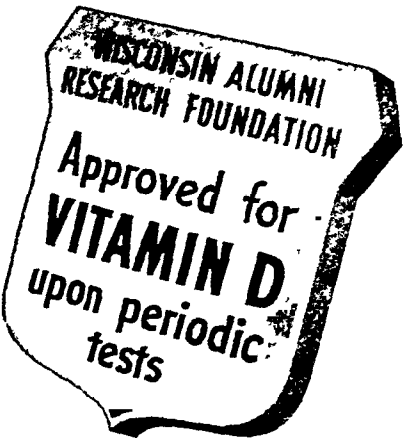
BACK IN 1500—

This Sign Was An Invitation

For almost 500 years "The Bell" has dispensed the traditional hospitality of the old-time English inn at Thetford, ancient capital of East Anglican kings.

And TODAY *This is Another Invitation*

. . . an invitation to use products bearing this insignia. It is used by many, many manufacturers to attest the Vitamin D content of their products. It guarantees that these products are regularly subjected to Wisconsin Alumni Research Foundation tests to make certain they meet its high standards and rigid requirements. For many years the Foundation seal has proved an invitation to the medical profession to recommend products so identified.



WISCONSIN ALUMNI *Research* FOUNDATION

MADISON 6, WISCONSIN

PERIODICI SCIENTIFICI CAPPELLI, BOLOGNA

Ciascun Volume in abbonamento per l'Italia L. 800—Estero L. 1500

ANNALI ITALIANI DI CHIRURGIA
Diretto da R. Paolucci, A. M. Dogliotti, F. P. Tinozzi.

ANNALI DI RADIOLOGIA DIAGNOSTICA
Diretto da A. Rossi.

ARCHIVIO ITALIANO DI ANATOMIA E ISTOLOGIA PATOLOGICA
Diretto da A. Businco.

ARCHIVIO ITALIANO DI CHIRURGIA
Diretto da R. Paolucci, C. M. Fasiani, G. G. Forni, G. Fedeli.

ARCHIVIO ITALIANO DI DERMATOLOGIA, SIFILOGRAFIA E VENEREOLOGIA
Diretto dai Proff. G. Falchi, F. Flarer, L. Martinotti, E. G. Scolari.

ARCHIVIO ITALIANO DELLE MALATTIE DELL' APPARATO DIGERENTE
Diretto da C. Frugoni, G. M. Fasiani, E. Milani.

ARCHIVIO ITALIANO DI PEDIATRIA E PUERICOLTURA
Diretto da G. Frontali.

ARCHIVIO DI ORTOPEDIA
Diretto da A. Poli.

ARCHIVIO ITALIANO DI UROLOGIA
Diretto da L. Pisani.

ARCHIVIO DI PATOLOGIA E CLINICA MEDICA
Diretto da A. Gasbarrini, D. Cesa Bianchi, A. Dalla Volta, G. Sotgiu, L. Villa.

ARCHIVIO DI SCIENZE BIOLOGICHE
Diretto da G. Bergami, G. Quagliariello, S. Visco.

BOLLETTINO DI OCULISTICA
Diretto da V. Cavara.

LA CLINICA
Diretta da R. Paolucci, A. Gasbarrini.

ENDOCRINOLOGIA E SCIENZA DELLA COSTITUZIONE
Diretto da A. Gasbarrini, N. Pende.

L'OTO-RINO-LARINGOLOGIA ITALIANA
Diretto da P. Caliceti.

RIVISTA ITALIANA DI GINECOLOGIA
Diretta da G. Aymerich, L. Bacialli, C. Decio, G. Paroli, S. Scaglione.

Ciascun Volume in abbonamentoper l'Italia L. 1000—Estero L. 1800
CHIRURGIA DEGLI ORGANI DI MOVIMENTO
Diretto da F. Delitala.

Just Released

A New Mosby  *Publication*

INFANT NUTRITION

by PHILIP C. JEANS, M.D., Professor of Pediatrics, College of Medicine, State University of Iowa, and the late WILLIAM McKIM MARRIOTT, M.D., Professor of Pediatrics, Washington University School of Medicine.

After a lapse of several years, this popular text returns to the Mosby list in a new, completely modern Fourth Edition.

Dr. Jeans has revised the text thoroughly—overlooking none of the great strides made in the field of nutrition since publication of the last edition.

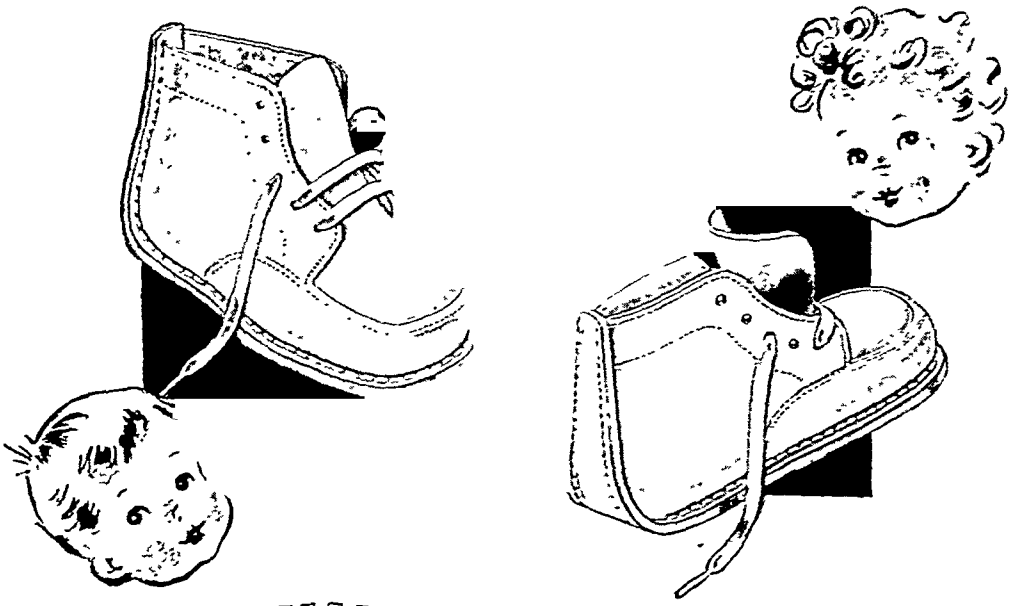
Changes and additions have been made in relation to Development; Minerals; the Vitamins and Infant Diseases. There is a comparative analysis of human and cows' milk, with discussion of artificial feeding.

495 Pages 36 Illustrations Price $6.50

The C. V. MOSBY *Company*

SAINT LOUIS SAN FRANCISCO

JUMPING-JACKS . . . FOR CHILDREN 6 MONTHS TO 3 YEARS OLD



JUMPING-JACKS

SOFT SHOES FOR HARD WEAR

CHILDREN'S SHOES YOU CAN RECOMMEND WITH CONFIDENCE

Note that exclusive, patented extension sole running from the toe all the way up the heel to the shoe-top. That is why, doctor, from the child's first step until hard-shoe time, Jumping-Jacks gently but firmly make him learn to walk right. So recommend them with full confidence that they are not only shoes of excellent materials and workmanship, splendid values, and so smart that mothers will want their children to wear them, but that they are also shoes which will achieve these six essential results:

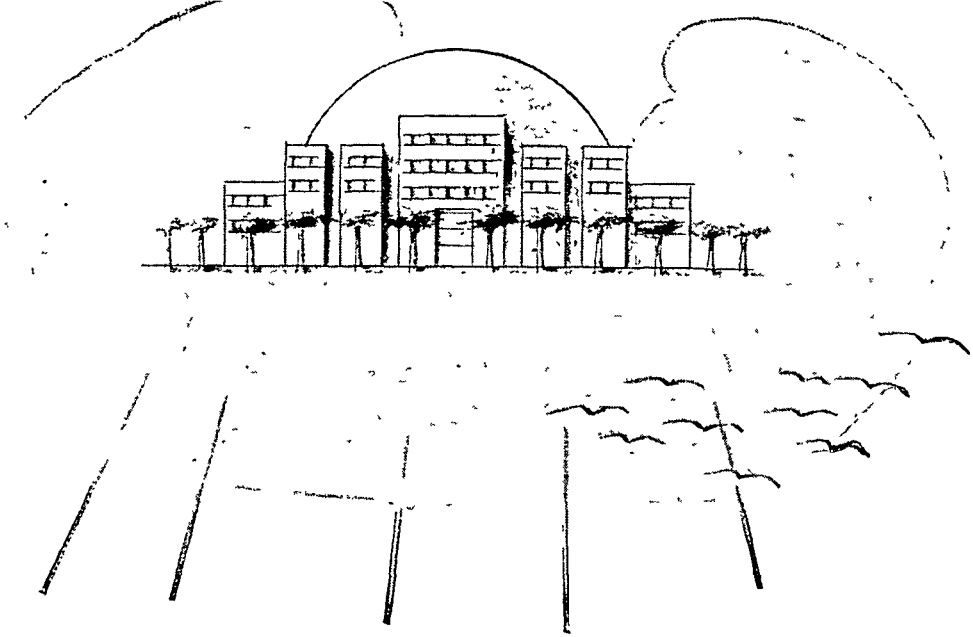


- Make the child walk straight by holding the heel bones in correct position
- Prevent the ankles from turning in or out.
- Develop foot and leg muscles . no stiff counters or shanks
- Hold their shape until outgrown . . . no heel or striking edge to wear off.
- Provide proper flexibility . . . walking in Jumping-Jacks is like walking barefoot.
- Furnish correct support so that the child will step out with confidence.

Write for descriptive literature and name of nearest Jumping-Jack dealer

VAISEY–BRISTOL SHOE CO., INC.

625 SO. GOODMAN STREET



Dream Hospital . . .

The hospital depicted here exists only in the hearts of men and women who are losing the grim battle with cancer. And in the imagination of other men and women who want desperately to provide a haven for these victims in need of hope and care to sustain them in the few months or years still remaining to them.

Actually, there is not a single such hospital anywhere devoted exclusively to these unfortunates who *may* be beyond the help of medical sciences, but who are still certainly in urgent need of hospital care. And only a limited, woefully insufficient number of beds available to them in other hospitals.

During the long years of the war we gave up our plans for the building of this dream hospital . . . Hope Institute.

But now we are more than ever determined to see it rise in stone and steel. A model hospital, the first of its kind . . . cheerful and comfortable in every way . . . with more the atmosphere of an apartment hotel than of a cold institution. Where the patients, depending upon their condition, can enjoy the warm hospitality of lounge and dining room, or retire to the merciful seclusion of a private room.

What do we need to build this hospital now? **You.** Every dollar or penny you can scrape together for it. Whether or not you know this tragedy from bitter personal experience . . . the tragedy of whole families, endlessly frustrated in their determination to care for a doomed member . . . give as generously as you can. Please fill out the coupon below and mail with your contribution. It will make this hospital more than a dream.

NCF

THE NATIONAL CANCER FOUNDATION
Griffin Building, 85 Franklin Street, New York 13, N. Y.

NAME ----------

ADDRESS ----------

Make checks payable to Abbott Kimball, Treasurer of the National Cancer Foundation.

THE NATIONAL CANCER FOUNDATION

Affiliated with

SPONSORS OF GOVERNMENT ACTION AGAINST CANCER

THE NATIONAL FOUNDATION FOR THE CARE OF ADVANCED CANCER PATIENTS



Speed Recovery in

CERVICITIS

PENICILLIN VAGINAL SUPPOSITORIES

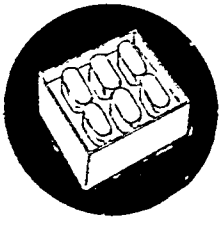
Schenley

Particularly useful in the medical and surgical management of cervicitis due to (or complicated by) penicillin-sensitive organisms.

ADVANTAGES • Potent dosage at site of infection—each suppository provides 100,000 units of penicillin • Painless administration • Simplicity and convenience.

Early favorable response establishes the effectiveness of Penicillin Vaginal Suppositories Schenley.

Suggested Dosage: One suppository on retiring or as required.



Supplied in boxes of 6 and 12

SCHENLEY LABORATORIES, INC.
Executive Offices: 350 Fifth Ave., New York 1, N. Y.

© Schenley Laboratories, Inc.

Just Released!

A New Mosby  *Publication*

The

SKIN MANIFESTATIONS OF INTERNAL DISORDERS

(Dermadromes)

by KURT WIENER, M.D.

Dermatologist, Mount Sinai Hospital, Deaconess Hospital, St. Michael's Hospital, Milwaukee, Wisconsin.

680 Pages *400 Illustrations, 6 in color* *Price, $12.50*

This new book marks the first presentation in recent years dealing with skin manifestations of internal disorders—and the very first presentation which covers the field in a complete manner.

While articles and books have been published on the subject, they have either been devoted to particular phases or parts—and emphasis has been on the internistic aspect, rather than the dermatologic.

By coining the word "dermadrome"—meaning, the skin part of a syndrome—Dr. Wiener covers accompaniments as well as actual skin manifestations of internal diseases.

The coverage of the book is complete with a few exceptions. The author has not attempted to condense to a chapter the skin manifestations of syphilis, because he feels that it would not be done justice.

The book is written for the dermatologist—as well as the general practitioner and internist—and therefore all information which might be necessary for each and all is included.

Use Coupon to Order

THE C. V. MOSBY COMPANY MJ
3207 Washington Blvd., St. Louis 3, Missouri

Gentlemen: Please send me a copy of—
Wiener's SKIN MANIFESTATIONS OF INTERNAL DISORDERS
PRICE, $12.50

☐ Enclosed find check. ☐ Charge my account.

Dr. _____

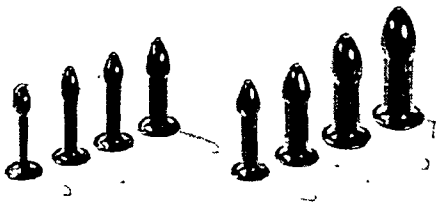
Address _____

CHILDHOOD LETHARGY

nervousness and insomnia

are often the result of faulty elimination. Muscle tone greater than normal, especially in association with an atonic colon, is often reduced by mechanical dilatation with Young's Rectal Dilators.

YOUNG'S RECTAL DILATORS



CHILDREN'S
4 graduated sizes
0, 1, 1½, and 2

ADULT'S
4 graduated sizes
1, 2, 3 and 4

More serious obstructions are sometimes eliminated by repeated dilatations, and normal function is resumed. 15 to 30 minutes' daily use tends to promote habit time. Sold only on B.

- Available at ethical drugstores or from your surgical supply house. Write today for complete literature.

F. E. YOUNG & COMPANY

434 E. 75th St. Chicago 19, Ill.

THE SPASTIC CHILD

By MARGUERITE K. FISCHEL. 97 pages, 14 illustrations. PRICE, $1.50.

Mrs. Fischel's account of her work, her disappointments, and her ultimate success is written in an easy and informal style. Each step of her self-imposed task is described fully with illustrations to clarify the method of treatment. "The Spastic Child" is an interesting, informative, and, above all, encouraging story of a mother's experience in the field of a little understood disease. *The C. V. Mosby Co., Publishers, St. Louis 3, Mo.*

See Page 45

for further information about

FORMULAC infant food

the vitamin-and-mineral fortified infant diet



Dennison DIAPER LINERS

Physicians and nurses have found that Dennison Diaper Liners make the diaper problem simpler and easier for new mothers. Physicians and nurses recommend Diaper Liners because they are sanitary, and so soft next to baby's tender skin that they help prevent chafing and help guard against diaper rash.

Diaper Liners make diaper washing much less disagreeable. Hours of hard scrubbing are eliminated. The Liner is simply folded inside diaper. When soiled, the Liner is flushed away. Quick, simple, easy!

Suggest Dennison Diaper Liners to new mothers, and to your hospital, too. The cost is only a few cents a day.

DELUXE: 180 for $1.00—Cradle Time & Downeesoft: 180 for 69c

DENNISON, Dept. X-214
Framingham, Mass.

FREE Please send me a whole day's supply of Dennison Diaper Liners.

Name.....

Street.....

City..... Zone ... State.....



The rooster's legs are straight.

The boy's are not.

The rooster got plenty of vitamin D.

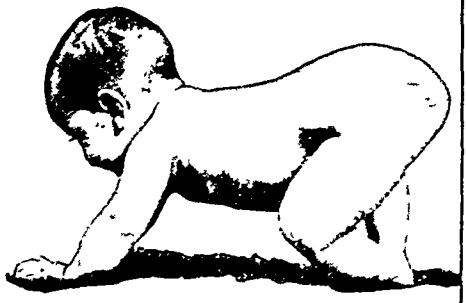
Fortunately, extreme cases of rickets such as the one above illustrated are comparatively rare nowadays, due to the widespread prophylactic use of vitamin D recommended by the medical profession.

One of the surest and easiest means of routinely administering vitamin D (and vitamin A) to children is MEAD'S OLEUM PERCOMORPHUM WITH OTHER FISH-LIVER OILS AND VIOSTEROL. Supplied in 10-cc. and 50-cc. bottles Also supplied in bottles of 50 and 250 capsules Council Accepted. All Mead Products Are Council Accepted. Mead Johnson & Company, Evansville 21, Ind., U.S.A.



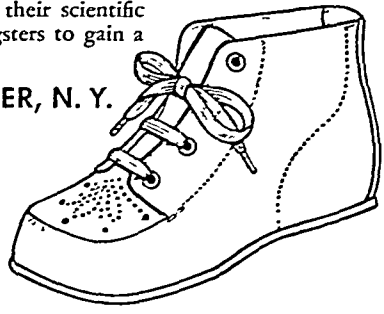
A FUTURE ALL-AMERICAN...

IF HIS FEET HOLD OUT!



SUCCESS in life is dependent upon physical and mental well-being. And these in turn are dependent upon proper care and development during early childhood. It is during that important period of development... *from start to six years old* that careful consideration should be given the care of infants' feet. SELF-STARTER Shoes, because of their scientific design and construction are helping thousands of youngsters to gain a head start... *FEET FIRST!*

Write for interesting leaflet and name of nearest experienced fitter.



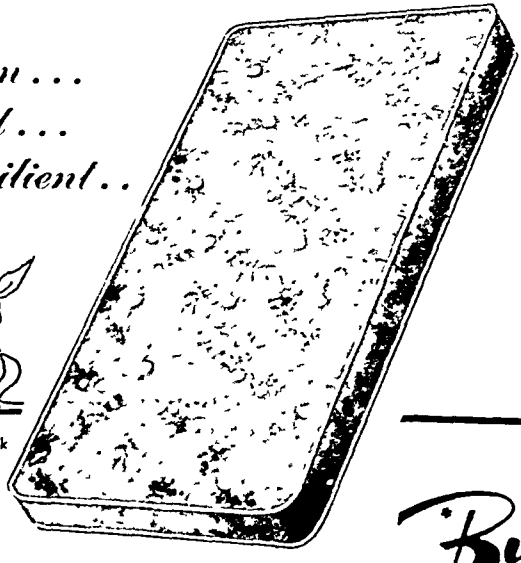
CARPENTER SHOE COMPANY, ROCHESTER, N. Y.

Self-Starters
FROM START TO SIX YEARS OLD

NEVAWET*

Crib Mattress

Firm...
Flat...
Resilient..

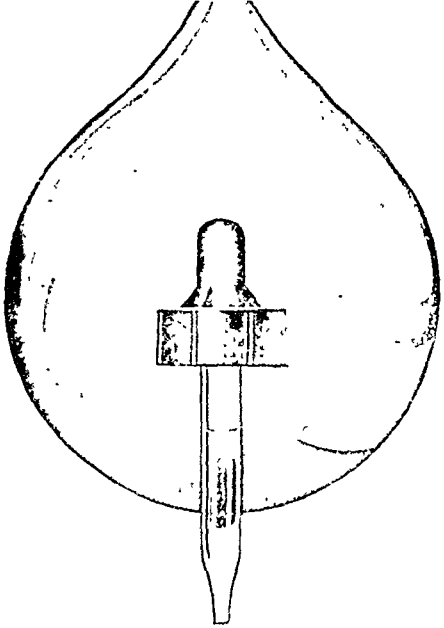




- fully interwoven, tempered steel innerspring... rigid border wire, top and bottom
- all new cotton felt filling
- Surfacoted* for resistance to water, oil and uric acid
- Cova-tufted* for protecting baby against bare buttons
- Attractive cover designs
- Superior workmanship

*Trade Mark

Bunny Bear
EVERETT, MASS.



A DROPPER FULL OF COMFORT

A grateful patient is the reward of the physician who prescribes Solution 'Tuamine Sulfate' (2-Aminoheptane Sulfate, Lilly) for the relief of nasal congestion. Administered by spray or dropper, Solution 'Tuamine Sulfate' quickly shrinks the nasal mucosa, permitting easy, natural breathing. There is no secondary engorgement or central-nervous-system stimulation. Specify Solution 'Tuamine Sulfate,' 1 percent for home use. The 2 percent solution is recommended for office procedures in which maximum shrinkage is desired.

ELI LILLY AND COMPANY

INDIANAPOLIS 6, INDIANA, U.S.A.

Vol. 31, No. 6, December, 1947. The Journal of Pediatrics is published Monthly by The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo., Subscription price: United States, its possessions, Pan-American Countries, $8.50 a year; Canada, $10.00 (Canadian Currency); Foreign, $9.50. Entered as Second-Class Matter June 29, 1932, at the Post Office at St. Louis, Missouri, under the Act of March 3, 1879. Printed in the U. S. A.

Announcing the availability of PERTUSSIS IMMUNE SERUM (*human*) IN VACUUM DRIED FORM

Once again we have Pertussis Immune Serum (human) *in the preferred* vacuum dried form. *Orders from physicians anywhere filled quickly. 24-hour service to handle telegraph orders. For literature and full information, write to:*

The **PHILADELPHIA SERUM EXCHANGE**

A NON-PROFIT ORGANIZATION

1740 Bainbridge Street
Philadelphia 46, Pa.

See the improved Hygeia Nursing Unit

- Easy to clean.
- Fewer parts to handle—just bottle, nipple and cap.
- When bottles are filled, only necessary to remove cap at feeding time.
- Sterilized cap makes handy container for baby's other foods.

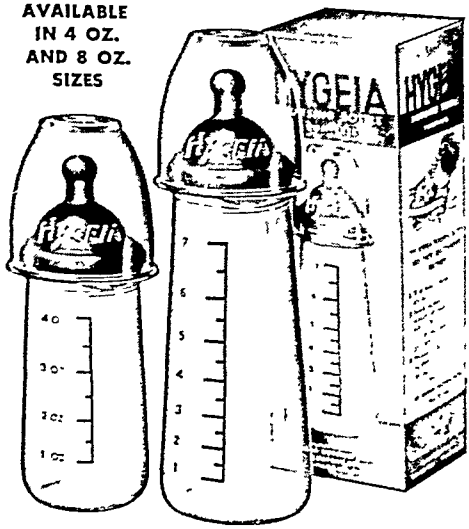
CAP . . . Keeps nipple germ-free for storing or out-of-home feeding. Sterilized cap may be used for orange juice, cereals, etc.

NIPPLE . . . Famous breast-shaped nipple has a patented airvent to insure steady flow of formula and reduce "wind-sucking." Sanitary tab keeps nipple sterile when applying. *Not necessary to touch feeding surfaces of nipple.*

BOTTLE . . . Wide mouth—easy to clean—no funnel required for filling. Red measuring scale easy to read. Tapered shape makes it easier for baby to hold.

Sample free to doctors on request.
Sold by druggists everywhere.
Hygeia Nursing Bottle Co., Inc.
1210 Main St., Buffalo 9, N. Y.

AVAILABLE IN 4 OZ. AND 8 OZ. SIZES



All Hygeia national ads say:
"CONSULT YOUR DOCTOR REGULARLY"

HYGEIA NURSING BOTTLES NIPPLES WITH CAPS
Sold complete as illustrated, or parts separately

Value of Variety in Prescribing Infant Diets

Excerpts from:

MITCHELL-NELSON TEXTBOOK OF PEDIATRICS
Edited by Waldo E. Nelson, M. D.
W. B. Saunders Company, Philadelphia and London 1946

". . . specific nutritional deficiencies are apt to occur only when the intake of certain classes of foodstuffs is deficient . . . In general . . . it should be recognized that diets which are deficient in one nutrient are apt to be deficient in others." Page 268

"Severe malnutrition in infants . . . is observed with much less frequency than was formerly the case. This decrease in incidence probably represents improvement in the artificial feeding of infants . . ." Page 270

ALL ABOUT FEEDING CHILDREN

Milton J. E. Senn, M.D. and Phyllis Krafft Newill
Doubleday, Doran & Co., Inc., Garden City, N. Y. 1944

"It is almost invariably true that a baby who learns to eat a variety of suitable new foods during the early months of life grows up with better food habits than one whose introduction to them is delayed." Page 71

"Vegetable soups offer an attractive means of getting a variety of vegetables into the diet . . ." Page 190

Each Campbell's Baby Soup is a combination of a Variety of Foods



Four of Campbell's Baby Soups—the Chicken, Beef, Lamb and Liver—consist of these meats combined with 5 to 7 vegetables each, and cereal.

They are main dish foods . . . so highly concentrated they supply all the meat, all the vegetables a healthy baby needs.

The fifth soup is Vegetable. In it are combined 8 vegetables and oatmeal. This is a valuable supplement to an egg yolk meal.

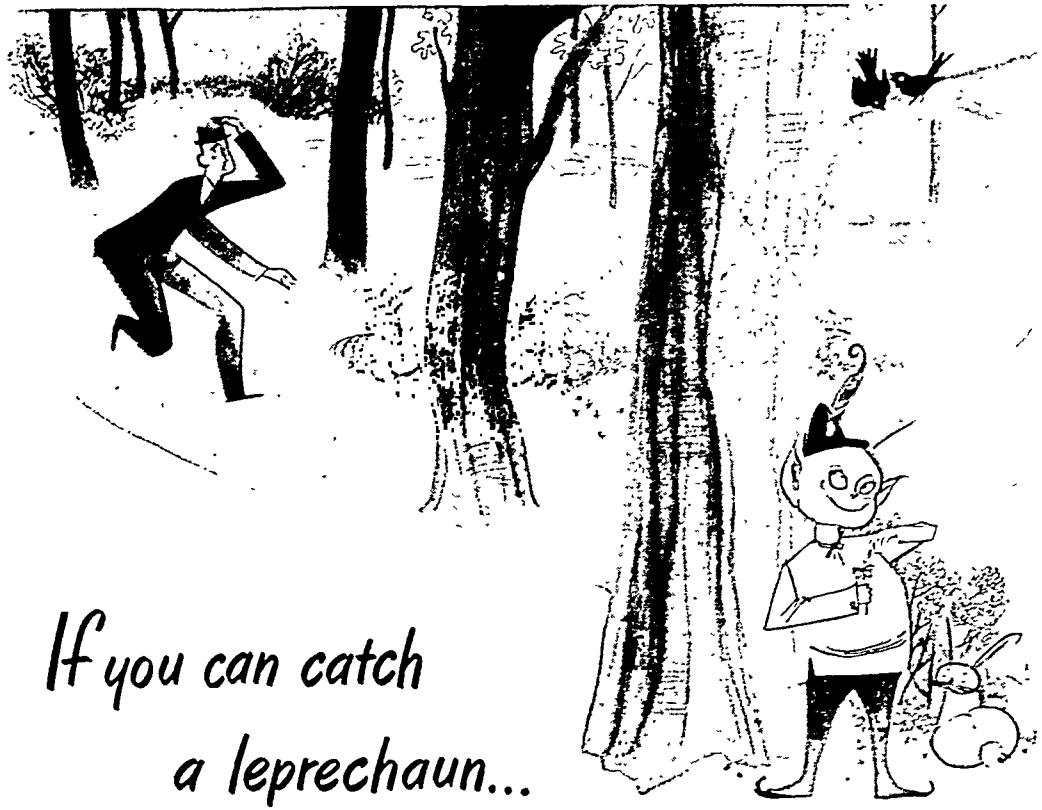
All are of strained food consistency; and may be fed as early as any strained food.

Their consistent day-by-day use is a definite aid in building sound and optimum diets for babies.

Dietetic analysis of these strained foods will be sent to any doctor upon request.

CAMPBELL'S STRAINED COMBINATION BABY SOUPS:
CHICKEN COMBINED WITH 5 VEGETABLES+CEREAL
BEEF COMBINED WITH 6 VEGETABLES+CEREAL
LAMB COMBINED WITH 5 VEGETABLES+CEREAL
LIVER COMBINED WITH 7 VEGETABLES+CEREAL
VEGETABLE, A COMBINATION OF 8 VEGETABLES+OATMEAL

Every grocer who sells Campbell's Soups can supply Campbell's Baby Soups.



If you can catch a leprechaun...

A leprechaun, according to Irish legend, is a dwarf who keeps a pot of gold hidden away.

If you can catch a leprechaun, your troubles are over.

Because he keeps his gold just for ransom money. If you catch him, he'll quickly tell you where his gold is, so you'll let him go.

The best place to look for a leprechaun is in the woods. They're green, and only about nine inches tall, so you'll have to—

Or maybe you don't believe in leprechauns.

Maybe it would be more practical to just keep working for your money. But you can learn one good lesson from these little fellows.

A small pot of gold put to one side is a great help when trouble catches *you.*

And there's a much faster and easier way to get your pot of gold than by catching leprechauns.

You can buy U. S. Savings Bonds through an *automatic* purchase plan.

If you're employed you can sign up for the Payroll Savings Plan. If you have a bank account you can sign up for the Bond-A-Month Plan.

Either way, your pot of gold just saves itself, painlessly and automatically.

And your money increases one third every ten years. That would make a leprechaun turn even greener with envy.

Save the easy, automatic way—with U.S. Savings Bonds

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.



For little people with big ideas . . .

A sick child, even at best, presents a problem—especially when it comes to downing unpleasant, hard-to-take medication. That is why so many doctors and parents have welcomed Sulfadiazine *Dulcet* Tablets. These palate-tempting pink cubes were designed from the child's point of view as well as the physician's. In appearance, odor and taste, they are candies. As medication, they are accurately standardized to produce the same therapeutic results as sulfadiazine in ordinary form. Children like them, and so do adults who find it difficult to swallow tablets or capsules. Sulfadiazine *Dulcet* Tablets may be chewed, dissolved in the mouth as troches, or crushed and taken in a spoonful of water. Prescribe them as you would sulfadiazine in any other form. Supplied in two sizes: 0.15 Gm. (2½ grs.) and 0.3 Gm. (5 grs.), bottles of 100. For literature on these and three other sulfa *Dulcet* Tablets (sulfathiazole, sulfamerazine and the new Diazoline*, which advantageously combines sulfadiazine and sulfathiazole), write to ABBOTT LABORATORIES, North Chicago, Illinois.

*TRADE MARK

SULFADIAZINE *Dulcet*® TABLETS

(Medicated Sugar Tablets, Abbott)

Ready Soon!

NEW SECOND EDITION

Communicable Diseases

by FRANKLIN H. TOP, A.B., M.D., M.P.H., N.A.C.P., Medical Director, Herman Kiefer Hospital; Clinical Professor of Preventive Medicine and Public Health, Wayne University College of Medicine.
900 pages, 98 illustrations, 13 Color Plates. PRICE, $8.50

For the new edition of this outstanding volume, a complete revision has been made. All chapters have been reviewed and improved, many have been enlarged. Three chapters have been completely rewritten: Influenza, Malaria, and Rickettsial Diseases.

Fourteen completely new chapters have been added. These are: Coccidioidomycosis; Rheumatic Fever; Primary Atypical Pneumonia; Epidemic Diarrhea of the Newborn; Infectious Hepatitis; Chancroid; Lymphogranuloma Venereum; Granuloma Inguinale; Ophthalmia Neonatorum; Epidemic Keratoconjunctivitis; Leptospiral Jaundice; Ringworm of the Scalp; Trachoma; Infectious Hononucleosis.

Because of the importance of illustrative matter in this subject, many new illustrations have been added for this second edition.

Collaborators

Theodore J. Abernethy
A. R. B. Allen
C. H. Binford
Patience L. Clarke
L. T. Coggeshall
G. D. Cummings
Bruce H. Douglas
Thomas Francis, Jr.
Parker Heath
Joseph G. Molner
Gordon B. Myers
Laura E. Peck
David D. Rutstein
Jonas E. Salk
George Sewell
Loren W. Shaffer
Charles E. Smith
John C. Snyder
Louise M. Suchomel
Warren E. Wheeler

Order Form

THE C. V. MOSBY COMPANY
3207 Washington Blvd., St. Louis 3, Mo. MJ

Dear Sirs: Please send me a copy of Top's COMMUNICABLE DISEASES. The price is $8.50.

☐ Attached is my check. ☐ Charge my account.

Name_____

Address_____



Uniformly Good Results

The weight curves represented above are to be found in actual hospital (name on request) records of 75 *consecutive* infants fed on Similac for six months or longer. Not once in this entire series of 75 cases was it necessary to change an infant's feeding because of gastro-intestinal upset.

Similarly good uniform results are constantly being obtained in the practice of many physicians who prescribe Similac routinely for infants deprived, either wholly or in part, of mother's milk.

ACCEPTED American Medical Association

A powdered, modified milk product especially prepared for infant feeding, made from tuberculin tested cow's milk (casein modified) from which part of the butter fat has been removed and to which has been added lactose, cocoanut oil, cocoa butter, corn oil, and olive oil. Each quart of normal dilution Similac contains approximately 400 U.S.P. units of Vitamin D, and 2500 U.S.P. units of Vitamin A as a result of the addition of fish liver oil concentrate.

SIMILAC *Similar to breast milk*

M & R DIETETIC LABORATORIES, INC. • COLUMBUS 16, OHIO

INDEX TO ADVERTISERS

Please mention "The Journal of Pediatrics" when writing to our advertisers—It identifies you

Abbott Laboratories (Tridione) ---- 4
Angier Chemical Company (T-Bardrin -- 14
Arlington Chemical Company, The (Neo-Cultol) ---- 10
Armstrong Company, The Gordon (Baby Incubator) ---- 3
Articles to Appear in Early Issues ---- 60
Ayerst, McKenna & Hartison Limited (Beminal) ---- 27

Beech-Nut Packing Company (Chicken Soup) ---- 39
Bischoff Company, Inc., Ernst (Diatussin) 51
Borden's Prescription Products (Dryco) ---- Fourth Cover
Borden's Prescription Products (Mull-Soy) 38
Breck, Inc., John H. (Breck Baby Ointment) ---- 52
Bunny Bear (Nevawet) ---- 67
Burroughs Wellcome & Co. (U. S. A.) Inc. (Dexin) ---- 30
Burroughs Wellcome & Co. (U. S. A.) Inc. (Ryzamin B) ---- 42

Campbell Cereal Company (Malt-O-Meal) 34
Campbell Soup Company (Baby Soups)-- 2
Carpenter Shoe Company (Self-Starters) 67
Castle Co., Wilmot (Lights & Sterilizers) 47
Cream of Wheat Corporation, The (Enriched 5 Minute Cream of Wheat) ---- 53
Cutter Laboratories (Diphtheria-Pertussis-Tetanus Combined) ---- 36

Dennison (Diaper Liners) ---- 65
Doho Chemical Corporation, The (Auralgan and Otosmosan) ---- 31
Donley-Evans & Company (Gluco-Sulfonamides) ---- 11

General Electric X-ray Corporation (Ultraviolet Lamp) ---- 19
George Washington University, School of Medicine ---- 56
Gerber Products Company (Baby Foods) 23
Great Atlantic and Pacific Tea Company, The (White House Evaporated Milk) -- 25
Green Shoe Mfg. Co. (Stride Rite) ---- 56

Heinz Company, H. J. (Vegetables with Lamb & Liver) ---- 24
Hoffmann-La Roche, Inc. (Vi-Penta Drops) ---- 37
Hygeia Nursing Bottle Co., Inc. (Nursing Unit) ---- 69

International Pharmaceutical Corporation (Glycerite of Hydrogen Peroxide) ---- 44

Johnson & Johnson (Baby Powder) ---- 5
Junket Folks, The (Rennet) ---- 15

Kinney & Sons, Inc., H. W. (Cartose) -- 54
Knox Gelatine (Gelatine) ---- 16

Lederle Laboratories, Inc. (Cerevim) --- 33
Libby, McNeill & Libby, Inc. (Homogenized Baby Foods) ---- 43
Lilly and Company, Eli (Penicillin) -- ---- Second Cover

M & R Dietetic Laboratories, Inc. (Similac) ---- 6
Marcelle Cosmetics, Inc. (Hypo-Allergenic Cosmetics) ---- 46
Massengill Company, The S. E. (Aldiazol) 32
Mead Johnson & Company (Oleum Percomorphum) ---- 76
Mead Johnson & Company (Pablum and Pabena) ---- 1
Merck & Co., Inc. (Vitamins) ---- 57
Merrel Company, The Wm. S. (Infa-Concemin) ---- 12

National Cancer Foundation, The ---- 72
National Confectioners' Association, The (Council on Candy) ---- 40
National Dairy Products Company, Inc. (Formulac) ---- 45, 65
National Drug Company, The (Diphtheria-Tetanus-Pertussis Combined) ---- 50

Parke, Davis & Company (ABDEC Drops) 7
Periodici Scientifici Cappelli, Bologna ---- 70
Pet Milk Company (Evaporated Milk) -- 55
Philadelphia Serum Exchange, The (Pertussis Immune Serum—Human) ---- 69
Pyramid Rubber Co., The (Evenflo Nurser) ---- 64

Quaker Oats Company, The (Quaker Oats) ---- 21

Ralston Purina Company (Ralston) ---- 48
Ralston Purina Company (Ry-Krisp) --- 35

Schenley Laboratories, Inc. (Penicillin Vaginal Suppositories) ---- 63
Schering Corporation (Sodium Sulfacetimide Solution 30%) ---- 13
Smith, Kline & French Laboratories, Inc. (Eskadiazine) ---- 26
Staley Mfg. Co., A. E. (Sweetose) ---- 8
Stearns & Company, Frederick (Essenamine) ---- 9
Stork Baby Products (Castile Soap) ---- 64
Swift & Company (Strained and Diced Meats) ---- 41

Tarbonis Company, The (Tarbonis) ---- 49

U. S. Savings Bonds ---- 71

Vaisey-Bristol Shoe Co., Inc. (Jumping-Jacks) ---- 61

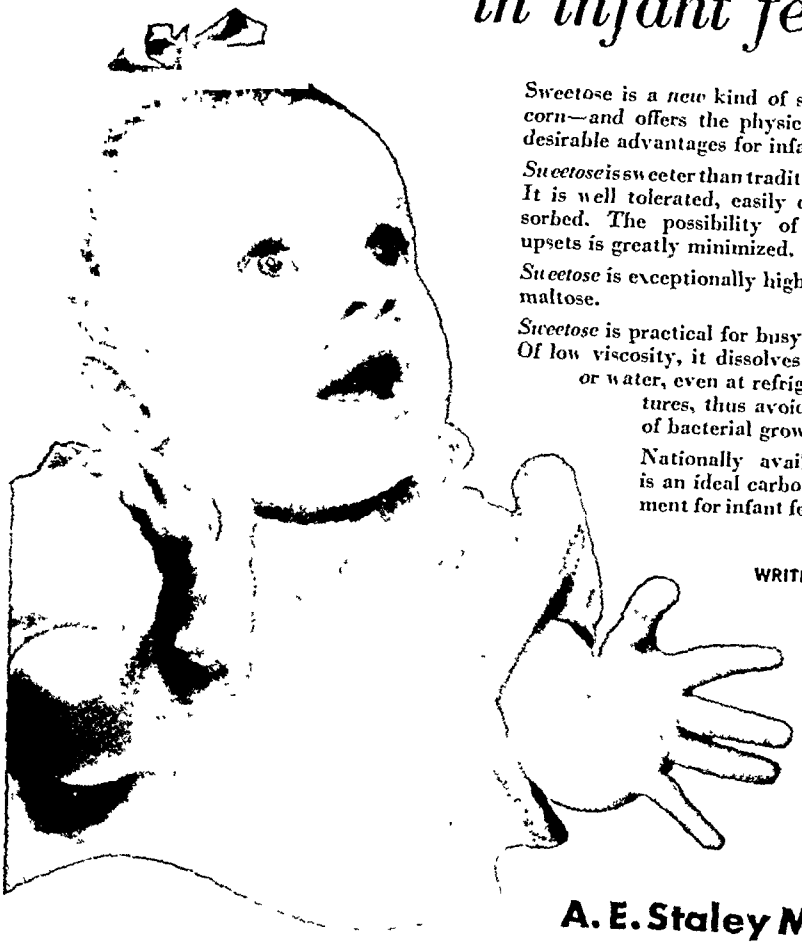
Walker Vitamin Products, Inc. (Vitamin Drops) ---- 22
Westwood Pharmacel Corp. (Lowila) --- 18
White Laboratories, Inc. (Cod Liver Oil Concentrate) -- Insert between pp. 4 and 5
White Laboratories, Inc. (Sulfathiazole Gum) ---- 28, 29
Winthrop Chemical Company, Inc. (Drisdol) ---- 17
Wisconsin Alumni Research Foundation (Foundation Seal) ---- 59
Wyeth Incorporated (S. M. A.) ---- 20

Young & Co., F. E. (Dilators) ---- 63

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.

Sweetose*

A new step forward in infant feeding



Sweetose is a *new* kind of syrup made from corn—and offers the physician a number of desirable advantages for infant feeding:

Sweetose is sweeter than traditional corn syrups. It is well tolerated, easily digested and absorbed. The possibility of gastrointestinal upsets is greatly minimized.

Sweetose is exceptionally high in dextrose and maltose.

Sweetose is practical for busy mothers to use. Of low viscosity, it dissolves rapidly in milk or water, even at refrigerator temperatures, thus avoiding stimulation of bacterial growth.

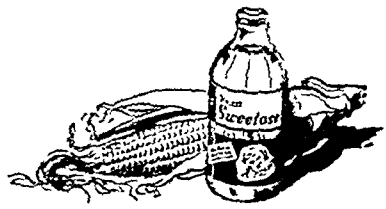
Nationally available, Sweetose is an ideal carbohydrate supplement for infant feeding *formulas*.

WRITE FOR FURTHER DETAILS

A. E. Staley Mfg. Co.
Box 1091, Decatur, Illinois

	Representative Analysis of Sweetose White Syrup	Representative Analysis of Ordinary Corn Syrup
Moisture	25.2	26.6
Dextrose	28.0	14.7
Maltose	25.5	13.9
Higher Sugars	12.0	13.6
Dextrines	9.1	24.8
Sucrose	0.0	6.2
Ash	0.2	0.2
Available Carbohydrates	74.6	73.2
Calories per fluid oz.	120.0	118.5

No added flavoring or salt.



*"Sweetose" is a trade-mark of the A. E. Staley Mfg Co., Decatur, Illinois, registered in the U. S. Patent Office.

CONTENTS FOR OCTOBER, 1947

Original Communications

A New Treatment for Diaper Rash. Reuel A. Benson, M.D., Lawrence B. Slobody, M.D., Lois Lillick, Ph.D., Anthony Maffia, M.D., and Norbert Sullivan, M.D., New York, N. Y. ---- 369

The Subcutaneous Administration of Sodium Sulfadiazine. Gilbert B. Forbes, M.D., George Donnell, M.D., and John C. Herweg, M.D., St. Louis, Mo. ---- 375

Rheumatic Fever Recurrences in Children Without Sulfonamide Prophylaxis: An Evaluation of Environmental Factors. Robert L. Jackson, M.D., Helen G. Kelly, M.S., Cecelia Healy Rehret, M.A., and Julia M. Duane, M.D., Iowa City, Iowa ---- 390

A Review of the Subject of Congenital Hemihypertrophy and a Complete Case Report. John Ward, M.D., and Henry H. Lerner, M.D., Salt Lake City, Utah ---- 403

Some Factors Which Influence the Duration of Breast Feeding. Mildred A. Norval, M.D., Rochester, Minn. ---- 415

Portal Cirrhosis of the Liver. Walter M. Block, M.D., Cedar Rapids, Iowa ---- 420

Dental Caries Experience in Postwar Italy (1945). II. Among Teen-Age Children in Naples. Maury Massler, D.D.S., M.S., and Isaac Schour, D.D.S., Ph.D., Chicago, Ill. ---- 431

Rabies. Carl E. Duffy, Ph.D., Paul V. Woolley, Jr., M.D., and Wilfred S. Nolting, M.D., With the Technical Assistance of Norma H. Feeley, Detroit, Mich. ---- 440

The Primary Etiology of the Specific Language Disabilities. Richard S. Eustis, M.D., Boston, Mass. ---- 448

Case Reports

Omphalocele With Diaphragmatic Defect and Herniation of the Liver Into the Pericardial Cavity. Lieutenant Wallace W. McCrory, and Lieutenant Colonel Rolin F. Bunch, Medical Corps, Army of the United States ---- 456

Sclerema Adiposum Neonatorum. Albert Sternbach, M.D., and Joseph Robinson, M.D., Brooklyn, N. Y. ---- 465

Adenoleiomyofibroma of the Tongue. Eugene L. Slotkowski, M.D., and Maxwell P. Borovsky, M.D., Chicago, Ill. ---- 470

Salmonella Carrier Treated Successfully With Streptomycin. Helen E. Swiller, M.D., A. Irving Swiller, M.D., and Frederick B. Traub, M.D., Brooklyn, N. Y. ---- 474

The Social Aspects of Medicine

Letter from Dr. Richard M. Smith on the Taft Bill ---- 476

Child Welfare in Britain. Alan Moncrieff, F.R.C.P., London, Eng. ---- 477

News and Notes

News and Notes ---- 480

Book Reviews

Feeding and Care of Baby, by Sir F. Truby King, C.M.G., M.B., B.Sc. 481

Editor's Column

Discrimination in Medicine ---- 482

vi-syneral vitamin drops

MORE COMPLETE VITAMIN PROTECTION because infants need not only vitamins A and D, but also B complex factors and ascorbic acid for optimum growth and development.

LIBERAL POTENCIES of necessary vitamins in a special aqueous base.

PROVIDES NATURAL VITAMIN D, concentrated from fish liver oil, considered superior to synthetic vitamin D.

PERFECT MISCIBILITY with infant's formula, milk, fruit juices, cereals, puddings, etc., being a clear, aqueous solution.

NO FISH TASTE OR ODOR, does not affect taste of foods.

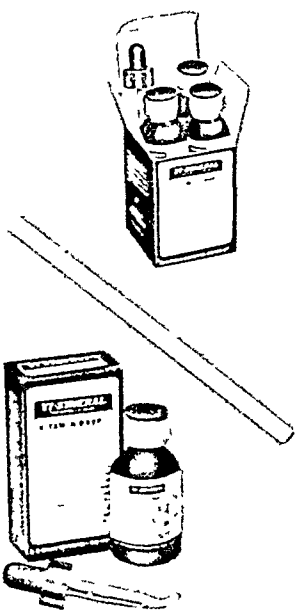
each 0.6 cc. as marked on dropper supplies:

Vitamin A	**5,000 U. S. P. Units**
Vitamin D	**1,000 U. S. P. Units**
Ascorbic Acid (C)	**50 mg.**
Thiamine (B_1)	**1 mg.**
Riboflavin (B_2)	**0.4 mg.**
Pyridoxine (B_6)	**0.1 mg.**
Niacinamide	**5 mg.**
Pantothenic Acid	**2 mg.**

natural vitamins A and D (concentrated from fish liver oil) in special aqueous base

in aqueous solution . . . contains no alcohol

Available in 15 cc. and 45 cc. packages



u. s. vitamin corporation

casimir funk laboratories, inc. (affiliate)

250 east 43rd st. • new york 17, n. y.

Send for sample,

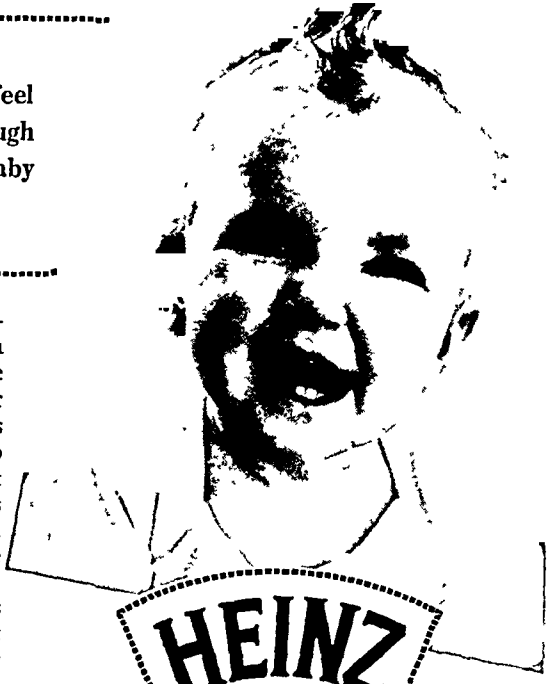
detailed literature and reprint.



COPYRIGHT, 1945, MEAD JOHNSON & CO.
EVANSVILLE, INDIANA, U.S.A.

When Quality Is Doubly Important

Like many thousands of doctors, you feel that only the best foods are good enough for your youngest patients! So Heinz Baby Foods merit your recommendation!



BECAUSE food *quality* is the first consideration when you're prescribing a diet for babies, Heinz Baby Foods deserve your recommendation. Backed by a 78-year tradition for dependability, these foods have their quality controlled from seed to grocer's shelf! For example, only the finest peas are used to make Heinz Strained Peas an appetizing nourishing dish babies enjoy. And of course Heinz Strained Peas are cooked, strained and packed according to the finest scientific methods Regular tests in Heinz Quality Control Department check the uniform flavor, color and texture of this product.

This is typical of the care with which all Heinz Baby Foods are prepared! You can recommend them with assurance that they are the finest money and skill can produce.

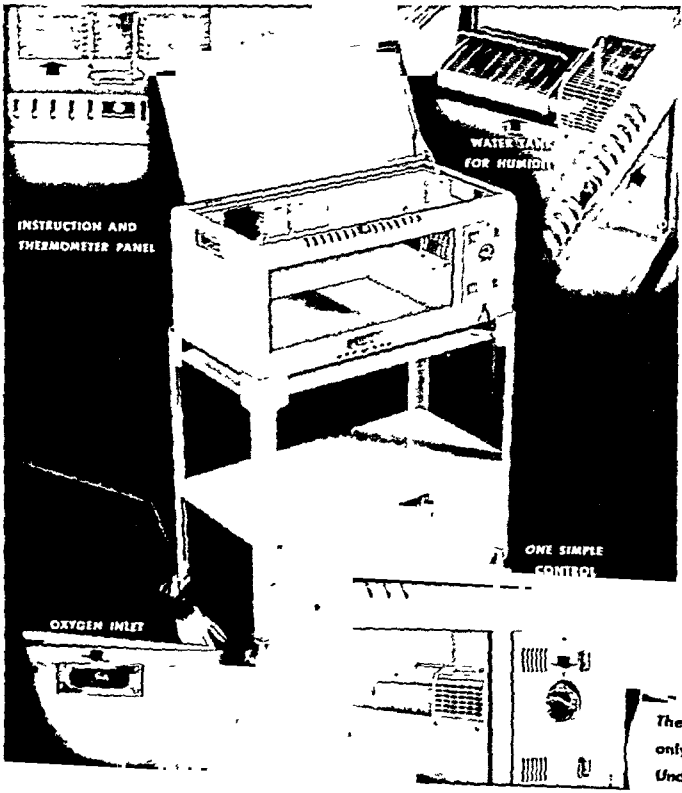
HEINZ
STRAINED
PEAS
57 VARIETIES
MADE BY
H. J. HEINZ COMPANY
57

Heinz Strained Peas Furnish Baby with Important Vitamins—for Heinz Retains More Uniform Vitamin Content Than Is Possible with Usual Home-Kitchen Methods.

HEINZ BABY FOODS

CEREALS • FRUITS • VEGETABLES
MEAT FOOD PRODUCTS • DESSERTS

ARMSTRONG X-4 PORTABLE BABY INCUBATOR



1. Low cost
2. Underwriter approved
3. Simple to operate
4. Only 1 control dial
5. Safe, low-cost, heat
6. Easy to clean
7. Quiet and easy to move
8. Ball-bearing, soft rubber casters
9. Fireproof construction
10. Excellent oxygen tent
11. Welded steel construction
12. 3-ply safety glass
12. Full length view of baby
14. Simple outside oxygen connection
15. Night light over control
16. Both F. and C. thermometer scales
17. Safe locking ventilator
18. Low operating cost
19. Automatic control
20. No special service parts
21. Lid locks open

The Armstrong X-4 Baby Incubator is the only Baby Incubator tested and approved by Underwriters' Laboratories for use with oxygen.

● In offering you the Armstrong X-4 Portable Baby Incubator we stand firmly on the principle that we must provide a SAFE Baby Incubator, a LOW COST Baby Incubator and a SIMPLE Baby Incubator.

That we have succeeded is evidenced by the fact that to date close to 400 Hospitals have placed voluntary repeat orders for more than 1200 additional Incubators. More and more it is being used, not only for the premature baby, but for any debilitated or under weight baby.

THE GORDON ARMSTRONG COMPANY

Division PPI • Bulkley Building • Cleveland 15, Ohio

Distributed in Canada by INGRAM & BELL, LTD. • TORONTO • MONTREAL • WINNIPEG • CALGARY • VANCOUVER

Export Distribution by GENERAL ELECTRIC MEDICAL PRODUCTS CO. • CHICAGO 3, ILLINOIS





HUNGRY, HEALTHY, HAPPY
Infa-Concemin Kids









Too young to be impressed by the fact that it's good for them, infants and children take Infa-Concemin because it tastes good. They like it! Infa-Concemin is the *one* B complex-iron concentrate designed specifically for small patients. It combines: (1) pleasant taste, (2) the *whole* B complex, (3) an adequate hematinic, and (4) concentrated drop dosage.

....INFA-CONCEMIN.....A MERRELL PEDIATRIC SPECIALTY...

Vitamin B Complex with Ferrous Sulfate

Each 1 cc. contains:

Thiamine hydrochloride	0.8 mg.
Riboflavin	0.8 mg.
Niacinamide	5.0 mg.
Pyridoxine hydrochloride	0.5 mg.
Liver, B complex fraction	67.5 mg.
Rice bran extract	67.5 mg.
Ferrous sulfate	37.5 mg.

Indications

Deficiency states associated with anorexia—malnutrition—restricted growth—irritability; as a tonic in post-sulfonamide debilitation and recuperative phases of severe respiratory infections.

Average dose 1 to 3 cc daily (20 to 60 drops from dropper enclosed in package) in milk, fruit juice or directly into the mouth. Available in 30-cc dropper bottles and 8 oz. bottles



Trademark "Infa Concemin" Reg U. S. Pat. Off.

MERRELL 1828

THE WM. S. MERRELL COMPANY · CINCINNATI, U. S. A.

Especially Valuable

in these Frequently Encountered

CUTANEOUS AFFECTIONS

ECZEMA
PSORIASIS
RINGWORM
OCCUPATIONAL DERMATITIS
FOLLICULITIS
SEBORRHEIC DERMATITIS
INTERTRIGO
PITYRIASIS
PRURITUS
TINEA CRURIS

Its wide range of therapeutic applicability and dependable efficacy make Tarbonis useful in the management of a host of skin conditions encountered daily. Tarbonis provides tar therapy in its most advantageous form. Its chief active ingredient (5 per cent) is a special process alcoholic extract of selected crude coal tars which exerts the characteristic action of tar, but is not burdened by the disagreeable odor and color of tar. Containing also menthol and lanolin in a vanishing cream base, Tarbonis is odorless, stainless, greaseless, and nonsoiling. When infection supervenes, Sul-Tarbonis—incorporating 5 per cent sulfathiazole in Tarbonis—is indicated.



Tarbonis is packaged in 2¼ oz., 8 oz., 1 lb. and 6 lb. jars.

Physicians are invited to send for samples and literature.

THE TARBONIS COMPANY
4300 Euclid Avenue Cleveland 3, Ohio

TARBONIS

SUL-TARBONIS

Sul-Tarbonis is supplied in 2¼ oz. and 1 lb. jars.



This Combination

CREAMY CONSISTENCY and PALATABLE FLAVOR

assures ready acceptance

INFANTS quickly learn to discriminate between foods which they like and those they dislike. At first, physical consistency and later taste are the two criteria on which a solid food is appraised.

From this standpoint Malt-o-Meal—a farinaceous wheat cereal flavored with toasted malt—ranks high as a desirable cereal food for infants. It quickly cooks to creamy consistency, and is entirely devoid of grittiness to which the infant might object. Its delightful flavor is appealing to infants and children. This combination—creamy consistency and palatable flavor—makes for ready acceptance.

Malt-o-Meal, in addition to the basic nutrients found in wheat, provides significant amounts of the B complex vitamins thiamine, riboflavin, and niacin, and makes an excellent contribution of iron. It is readily digested, is residue-free (fiber content 0.4%), and cannot overtax the digestive tract of infants.

CAMPBELL CEREAL COMPANY, Minneapolis, Minn.

Malt-o-Meal



Malt o-Meal, an enriched wheat cereal flavored with toasted malt, provides per ounce (dry weight), 0.29 mg. of thiamine 0.13 mg. of riboflavin, 1.09 mg. of niacin, and 2.00 mg. of iron Thus Malt-o-Meal provides appreciably more thiamine, riboflavin, and iron than does whole wheat, and 78% of the niacin content of whole wheat.

Why do Pediatricians recommend Ry-Krisp for children?

1. *Because it is crisp whole-grain bread, low in carbohydrates and fats. For these reasons—*

Ry-Krisp stimulates teeth and gums

Because it's crisp, Ry-Krisp provides the teeth and gum exercise children need. Good for youngsters in the "teething age," too.

Satisfies between-meal hunger

Only whole-grain rye, salt, and water in Ry-Krisp. Doesn't spoil regular mealtime appetites, because it is low in carbohydrates. Yet, Ry-Krisp supplies the protein, minerals, and B complex vitamins of whole rye. Its tempting flavor means good eating, too.

Keep Ry-Krisp in mind for your young patients

FREE TO YOU

Allergy Diets—Wheat-free, Egg-free, Milk-free, Wheat-Egg-Milk-free and Restricted Diagnostic. Send for booklet containing single copies so you may order free diet pads as needed. Use coupon below.



RALSTON PURINA COMPANY, Nutrition Service
JP-C Checkerboard Square, St. Louis 2, Missouri.

Please send, no cost or obligation: C2143 Allergy Diets Bookle

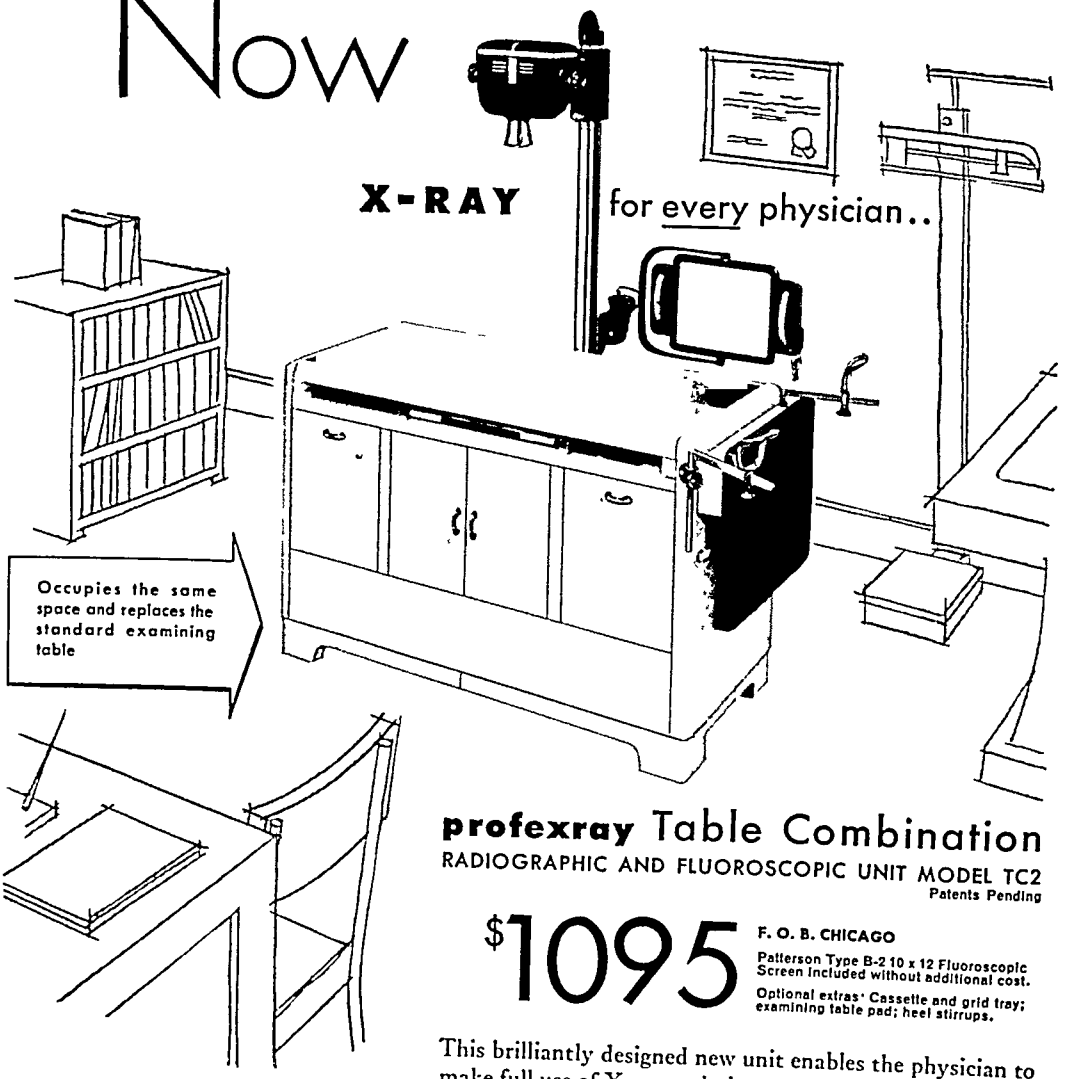
Name.....M

Street.....

City ..... *Zone* ..... *State*

Now

X-RAY for every physician..



profexray Table Combination

RADIOGRAPHIC AND FLUOROSCOPIC UNIT MODEL TC2

Patents Pending

$1095 F. O. B. CHICAGO

Patterson Type B-2 10 x 12 Fluoroscopic Screen included without additional cost.

Optional extras: Cassette and grid tray; examining table pad; heel stirrups.

This brilliantly designed new unit enables the physician to make full use of X-ray techniques *within his own office*. The unit, as pictured, is completely self-contained. It comprises a radiographic unit including the X-ray table, a fluoroscopic unit, a standard examining table, a built-in control unit, and ample storage space for unexposed film. Many design innovations provide for utmost convenience in use.

Like other PROFEXRAY units, the new Table Combination provides ample power and penetration to secure diagnostically excellent radiographs of skulls, chests, spines, extremities and articulations. The same versatile unit may be used to make the most complete fluoroscopic examination.

No floor rails, no special construction, no special wiring or power supply are required. The unit is shock-proof and ray-proof. A factory trained representative provides detailed instruction in its automatic operation. You are invited to request an office demonstration of PROFEXRAY . . . without assuming any obligation.

PROFESSIONAL EQUIPMENT COMPANY
615 S. Peoria St., Chicago 7, Illinois

Gentlemen: Your representative may arrange for a PROFEXRAY demonstration in my office. No obligation.

Name_____

Address_____

City_____ State_____

JP-12

aqueous vitamin A superior to oil solution

500% greater absorption

average peak blood levels in infants

aqueous A	**1000 U.S.P. Units**
oil A	**200 U.S.P. Units**

⅕th as much excretion

average fecal excretion in infants

aqueous A	**7% of ingested vitamin**
oil A	**38% of ingested vitamin**

confirmed by

85% higher liver storage

total liver storage levels in 24 hours (animals)

aqueous A	**7500 U.S.P. Units**
oil A	**4040 U.S.P. Units**

New clinical and laboratory studies[1] corroborate previous investigations[2–4] proving that vitamin A in aqueous solution—as available in VI-SYNERAL VITAMIN DROPS—is more readily and more fully utilized than vitamin A in oily solutions.

The process of making water solutions of the lipoid vitamins (A and D) was pioneered and developed by the research laboratories of the U. S. VITAMIN CORPORATION in 1943, protected by U. S. Patent No. 2,417,299.

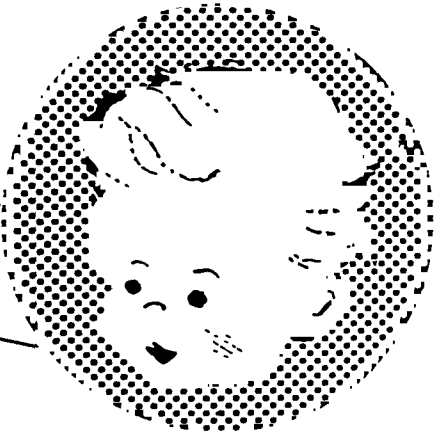
Former studies[5–6] have demonstrated the superior anti-rachitic value of vitamin D in aqueous dispersion as compared with D in oil solution.

1 Jl. Pediatrics: 31:496, 1947.
2 Am. Jl. Diseases of Children: 73:543, 1947.
3 Science: 105:40, 1947.
4 Nutrition Reviews: 4:254, 1947.
5 Jl. Pediatrics: 6:362, 1935
6 Jl. Pediatrics: 8:[illegible], 1936



when common sense says

OMIT SOAP



In INFANTILE ECZEMAS and DIAPER RASH

TO AVOID EXACERBATION

of infantile eczemas and diaper rash which may occur with soap, and to help prevent these conditions in sensitive babies . . .

USE LoWILA

COMPLETELY SOAPLESS, GENTLE, EFFICIENT SKIN CLEANSER

LoWILA provides a completely soapless, non-irritant skin cleansing regime; good lather, pH about that of normal skin.

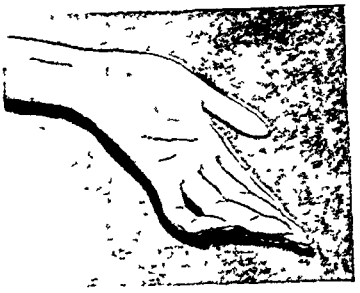
LoWILA Cake superbly mild, no alkali, less slippery allowing firmer hold on baby in bath. Economical.

LoWILA Liquid washes diapers beautifully, gently, without the irritating residue left by soaps. A little goes a long way.

LoWILA is kind to mother's skin too!

Westwood PHARMACAL CORP.
468 DEWITT ST., BUFFALO 13, N.Y.

WRITE FOR SAMPLE AND LITERATURE



women are always demanding*

When growth, menstruation, pregnancy, convalescence or dietary restrictions increase a woman's demands for iron . . .

Fergon®

BRAND OF FERROUS GLUCONATE

For Hypochromic Anemias

BETTER TOLERATED: Fergon is only slightly ionized, therefore virtually nonastringent, nonirritating, essentially free of gastro-intestinal distress

BETTER ABSORBED: Fergon—stabilized ferrous gluconate—is soluble and available for absorption throughout the entire pH range of the gastro-intestinal tract

BETTER UTILIZED: Comparative clinical studies show ferrous gluconate to be better utilized than other forms of iron †



Indicated in the treatment and prevention of anemias due to iron deficiency, especially valuable in patients intolerant to other forms of iron.

Average adult dose is 3 to 6 (5 grain) tablets, for children, 1 to 4 (2½ grain) tablets or 1 to 4 teaspoonfuls of elixir daily

Supplied as 0.325 Gm (5 grain) tablets, bottles of 100 and 500, 0.163 Gm (2½ grain) tablets, bottles of 100, 5% elixir, bottles of 6 and 16 fl. oz.

*

"Up to the age of menopause, women require from two to four times more iron than do men. Pregnant women also have a higher requirement. . . iron requirements are increased . . . at puberty (especially in girls) . . ."

Goodman L., and Gilman A. The Pharmacological Basis of Therapeutics. New York: The Macmillan Company, 1941, p. 1110-1115

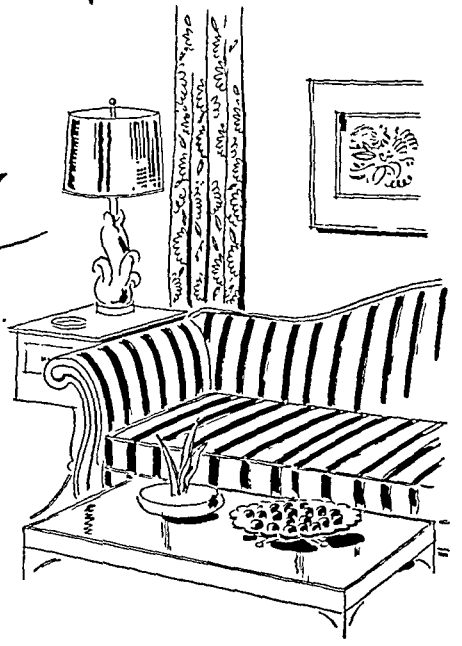
†Kerr W. F., and Goebel W. F. J. Clin. Investigation 1: 547, 1 1

Wintthrop-Stearns INC.

NEW YORK 13, N. Y. WINDSOR, ONT.

The businesses formerly conducted by Winthrop Chemical Company, Inc. and Frederick Stearns & Company are now owned by Winthrop-Stearns Inc.

On the Dual Value of *Candy*



Socially candy has long been accepted as a pleasant part of our daily lives. From early childhood on, candy is considered an appropriate accompaniment of the festive spirit of birthdays, holidays, anniversaries and other joyous occasions.

In recent years, with the advancing knowledge of nutrition, the values of candy as a worth-while part of the daily diet have also become recognized. Most of the kinds of candy manufactured today are made of a number of valuable foods which contribute to the extent they are used to the satisfaction of many nutritional needs.*

Whether enjoyed as a delectable tidbit during a friendly gathering—or served at the end of a family meal—or eaten as a quick energy food following strenuous activity, candy has a unique and valid place in the human dietary.

---

*The candies in the manufacture of which milk, butter, eggs, fruits, nuts or peanuts are used, *to this extent* also (a) provide biologically adequate proteins and fats rich in the unsaturated fatty acids; (b) present appreciable amounts of the important minerals calcium, phosphorus, and iron; (c) contribute the niacin, and the small amounts of thiamine and riboflavin, contained in these ingredients.

COUNCIL ON CANDY OF THE NATIONAL CONFECTIONERS' ASSOCIATION

1 NORTH LA SALLE STREET • CHICAGO 2, ILLINOIS



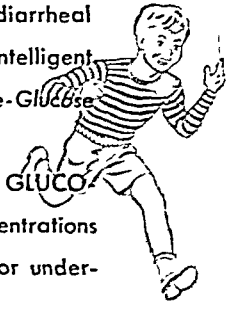
NOWHERE MORE STRIKING

"Nowhere are the results of sulfonamide more striking than in the treatment of diseases of children."

Smith, F. C.: Sulfonamide Therapy in Medical Practice. Philadelphia, F. A. Davis Co., 1944, p. 119.

GLUCO-SULFADIAZINE, in liquid form for oral use, is an ideal chemotherapeutic addition to the armamentarium against disease, especially in the treatment of diseases of children.

Striking results have been reported on the use of Sulfadiazine[1,2] in the treatment of acute diarrhea in children, especially the *Shigella* group. Since acidosis and dehydration accompany acute diarrheal diseases, GLUCO-SULFADIAZINE provides a basis for the intelligent use of a sulfonamide because it contains a *Sodium Lactate-Glucose* base in sufficient amount to maintain alkalinity.



For safer sulfonamide medication, rely on Donley-Evans' GLUCO-SULFONAMIDES—more rapid absorption; higher blood concentrations (than tablet form); positive dosage (eliminate overdosing or underdosing); ease of administration; exceptional palatability.

1. Watt, J., and Gutelius, M.: New Orleans M. & S. J. 99. 266, 1946.
2. Hardy, A. V.: Public Health Repts. 61 857, 1946.

Literature on request.

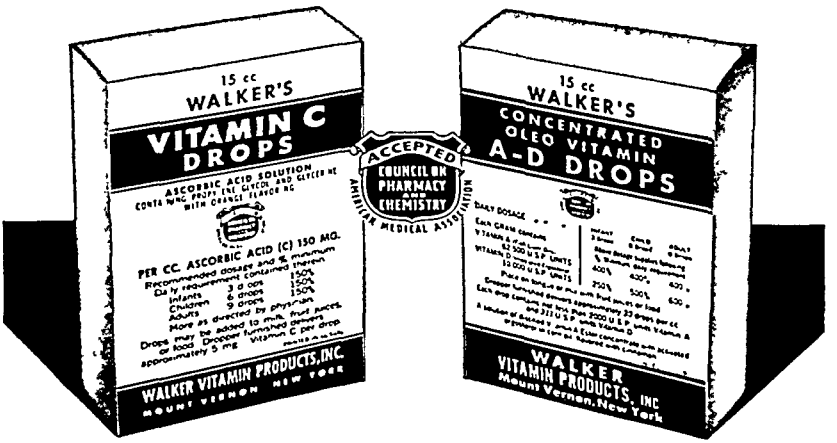


GLUCO-SULFADIAZINE
GLUCO-SULFATHIAZOLE
GLUCO-SULFAMERAZINE
GLUCO-SULFANILAMIDE

DONLEY-EVANS & COMPANY
ST. LOUIS 20, MISSOURI

WALKER

COUNCIL-ACCEPTED VITAMIN DROPS



Potent, convenient, flexible dosage form
Designated for use in pediatrics and geriatrics

VITAMIN C DROPS

Each drop supplies 5 mg. of vitamin C

Supplied in dropper bottles of 15 cc.

CONCENTRATED OLEO VITAMIN A-D DROPS

Each drop supplies 2,000 units vitamin A, 333 units vitamin D

Supplied in dropper bottles of 15 cc. and 60 cc.

Walker VITAMIN PRODUCTS, INC., MOUNT VERNON, N. Y.

changing
practice in
immunization

"Council-Accepted" Diphtheria and Tetanus Toxoids, Alum Precipitated, and Pertussis Vaccine Combined, with antigenic content of *H pertussis* increased to 45,000 million organisms per immunizing treatment, affords you and your patient

1 Fewer Injections

2 Simultaneous Immunization

3 More Rapid Protection

4 Time Saved

5 Economy



The use of multiple antigens, particularly combinations of diphtheria and tetanus toxoids, alum precipitated, and pertussis vaccine, is part of the changing practice in immunization.

Recommended for infants and pre-school age children, immunization consists of three 0.5 cc. subcutaneous injections at intervals of from four to six weeks.

SUPPLIED:

Single Immunization package contains three ½ cc. Vials

Five Immunizations package contains three 2½ cc. Vials

DIPHTHERIA and TETANUS TOXOIDS, ALUM PRECIPITATED, and PERTUSSIS VACCINE COMBINED

THE NATIONAL DRUG COMPANY
Philadelphia 44, Pa.

rapid eradication of...

SCABIES PEDICULOSIS

WITHOUT LOCAL IRRITATION OR REACTION

SPECIFICALLY LETHAL FOR THESE PARASITES



The Sarcoptes scabiei of scabies



Pediculus humanus

The specific antiparasitic action of Kwell Ointment—1% of the gamma isomer of 1,2,3,4,5,6-hexachlorocyclohexane in a vanishing cream base—greatly simplifies and shortens the treatment of many common skin infestations. Scabies may be eradicated in one or two treatments without local skin reaction. Pediculosis, regardless of body area involved, is usually overcome with a single application. Kwell Ointment thus establishes a new standard of therapeutic excellence in antiparasitic therapy, making possible rapid control of the invader without deleterious local irritation or troublesome dermatitis in the host. At all pharmacies. Samples and literature to physicians on request.

C.S.C. Pharmaceuticals

A DIVISION OF

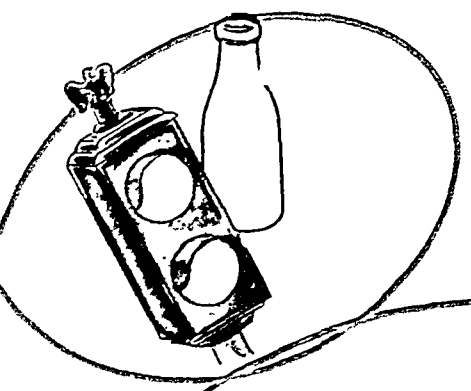
COMMERCIAL SOLVENTS CORPORATION

17 E. 42nd Street CSC New York 17, N.Y.

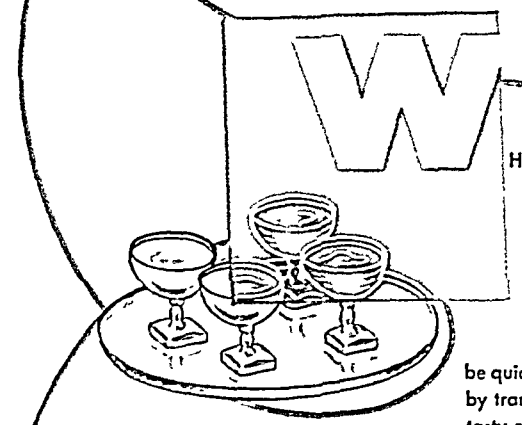


KWELL

OINTMENT



GIVING MILK THE GREEN LIGHT!

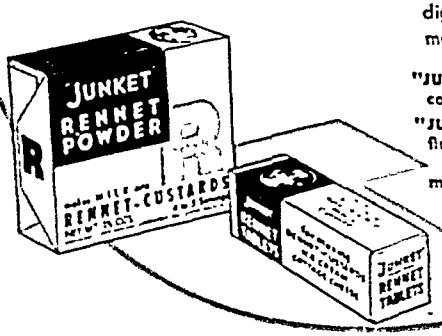


WHEN MILK IS A VITAL PART of the daily regimen, such as in infancy, childhood, pregnancy, and for gastro-intestinal, postoperative and geriatric conditions—a serious aggravation of the dietary problem may occur for those patients who (either for physiologic or psychologic reasons) are unable to ingest this essential nutrient.

In such cases, the *red light* of milk refusal may be quickly changed to the *green light* of eager acceptance—by transforming the liquid milk into deliciously flavored, tasty rennet desserts, through the medium of rennet powder or household rennet tablets.

Young and old alike relish these temptingly smooth custard-like desserts which incorporate the uncooked milk—with all nutritional factors unchanged—into a variety of delicious, colorful rennet desserts. They're so simple to prepare—and are more easily digested than milk itself, because of the softer, more friable curds formed in the stomach.

"JUNKET" is the trade-mark of Chr. Hansen's Laboratory, Inc., for its rennet and other food products, and is registered in the United States and Canada.



"JUNKET" RENNET POWDER—already sweetened—comes in six popular flavors;

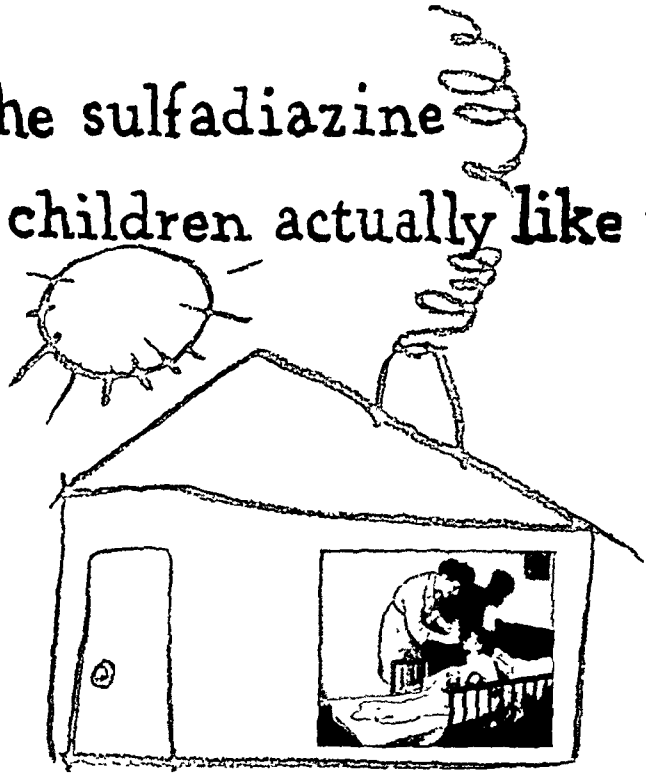
"JUNKET" RENNET TABLETS are not sweetened or flavored—just add sugar and flavor to taste.

Delicious, highly acceptable rennet desserts may be made with either.

"JUNKET" BRAND FOODS
Division of Chr. Hansen's Laboratory, Inc.
LITTLE FALLS, N. Y.

B-127

Here's the sulfadiazine that children actually like to take



Children have no reluctance in taking ***Eskadiazine***



Exceptionally flavorful, this fluid sulfadiazine is the ideal dosage form for your young patients. They take it willingly because it tastes good. And it relieves tired parents and busy nurses of the chore of crushing tablets and coaxing a sick child to swallow an unappealing mixture.

Important, too, is the more rapid absorption of Eskadiazine. Flippin and associates* have established that desired serum levels are attained in two hours, rather than the six hours required for sulfadiazine in tablet form.

Smith, Kline & French Laboratories, Philadelphia

Eskadiazine

*Am. J. M. Sc. 210 141. 1945

the outstandingly palatable fluid sulfadiazine for oral use

Why do Tom, Dick and Harry need Vitamin D ?



Growing children require vitamin D mainly to prevent rickets They also need vitamin D, though to a lesser degree, to insure optimal development of muscles and other soft tissues containing considerable amounts of phosphorus.

Milk is the logical menstruum for administering vitamin D to growing children, as well as to infants, pregnant women and lactating mothers This suggests the use of Drisdol in Propylene Glycol, which diffuses uniformly in milk, fruit juices and other fluids

Average daily dose for infants 2 drops, for children and adults 4 to 6 drops, in milk.
Bottles of 5, 10 and 50 cc.

DRISDOL IN PROPYLENE GLYCOL

MILK DIFFUSIBLE VITAMIN D PREPARATION

ODORLESS · TASTELESS · ECONOMICAL

WINTHROP STEARNS

DRISDOL, trademark reg U S Pat Off & Canada brand of crystalline vitamin D2 (calciferol) from ergosterol

Winthrop-Stearns INC.
NEW YORK 13, N. Y. WINDSOR, ONT.

The businesses formerly conducted by Winthrop Chemical Company Inc. and Frederick Stearns & Company are now owned by Winthrop Stearns Inc.

Announcing—

T-BARDRIN
(ANGIER)

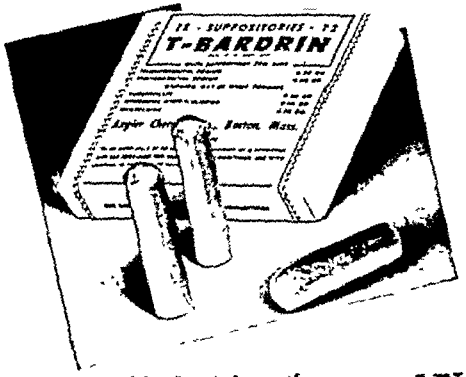
For faster, more prolonged relief in a greater percentage of Asthmatic and Hay Fever cases.

In rectal suppository form, T-BARDRIN uniquely combines ephedrine and theophylline with adequate sedation to provide both prompt and prolonged relief in cases where cardiac involvements are not a consideration.

Due to a synergistic action of multiple barbiturates, T-BARDRIN supplies the rapid and sustained sedative action so important in the treatment of both *asthmatic and hay fever patients.* As T-BARDRIN may be self-administered in accordance with prescribed routine, emergency and night calls are virtually eliminated.

CLINICAL STUDIES RECENTLY REPORTED EVIDENCE THE EFFICACY OF T-BARDRIN

	No. of CASES	RELIEF REPORTED				SYMPTOM FREE PERIOD (Hours)				INITIAL ACTION (Minutes)			REACTIONS
		MARKED	MODERATE	SLIGHT	NONE	8	16	24	36+	5	10	15	
ADULTS (all asthma)	42	30	2	1	9	4	10	16	3	5	25	3	2
CHILDREN 14 yrs. and under—60% Hay Fever, 40% Asthma	65	58	3		4				61	58	3		NONE



Samples and further information furnished when requested on professional letterhead.

FORMULA

Each T-BARDRIN suppository contains:

Pentobarbital sodium . . . . . 0.05 gm.
Phenobarbital sodium . . . . . 0.05 gm.
WARNING: May be habit-forming
Theophylline . . . . . 0.40 gm.
Ephedrine hydrochloride . . . 0.05 gm.
Benzocaine . . . . . 0.06 gm.
in a cocoa butter base.
(Available in boxes of 12 suppositories)

ANGIER CHEMICAL COMPANY
Boston 34, Massachusetts

Infants Gain 5 Nutritional Benefits With Early Feeding of QUAKER OATS



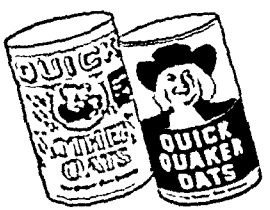
1. Whole-grain oatmeal is richest of all natural cereals in Protein.
2. Oatmeal contains all ten essential Amino Acids.
3. Oatmeal provides more Vitamin B_1 than any other natural whole-grain cereal.
4. More Food-Energy is contained in oatmeal than in any other natural cereal.
5. No other natural cereal equals oatmeal in Food Iron.

The scientific evidence of these important facts about oatmeal and a clear, concise discussion of the function of this natural cereal in the child's diet is contained in this useful new reference booklet:

"Oatmeal's Advantages as a Food for Children"
by
Fredus N. Peters, Jr., Ph. D
Director of Research
THE QUAKER OATS COMPANY

A copy of the booklet—which *also* includes many helpful quick-reference tables on comparative food values of cereals, recommending daily allowances of vitamins and minerals,—will be sent to you upon request and without obligation. Clip the coupon below and fill in you name, today!

Quaker Oats



Quaker and Mother's Oats are the same

•

The World's Best-Tasting Breakfast Food

Mail Coupon Today

The Quaker Oats Company
Box 712, Chicago 90, Illinois

Please send me a free copy of this new booklet "Oatmeal's Advantages as a Food for Children."

Dr.....

Address.....

City..... Zone.... State.....



Reduces **the hazards of**

intensive sulfonamide therapy

50th ANNIVERSARY

By combining sulfadiazine and sulfathiazole in a single preparation, the dangers of crystalluria and its troublesome complications are greatly reduced. Recent studies* have shown that the total urine solubility of two sulfonamides is greater than that of a single sulfonamide, since the presence of one exerts little influence upon the solubility of the other. Consequently, a greater total quantity of concurrently administered sulfadiazine and sulfathiazole can be dissolved in the urine than of either drug alone.

Added renal protection is provided in Aldiazol by the presence of sodium citrate and sodium lactate which alkalinize the urine and further increase sulfonamide solubility.

Rapid absorption of Aldiazol is promoted, since the contained sulfadiazine and sulfathiazole are in microcrystalline form. In consequence, higher blood levels are attained in shorter time than with ordinary sulfonamides.

Aldiazol is indicated whenever sulfonamide therapy is called for. Because of its liquid form, it is especially useful in children, facilitating accurate dosage as well as administration.

Each teaspoonful of Aldiazol contains:

Sulfadiazine (microcrystalline) 0.25 Gm.	Sodium Citrate .....0.50 Gm.
Sulfathiazole (microcrystalline) .0.25 Gm.	Sodium Lactate.....0.60 Gm.

*Lehr, D.: Proc.Soc.Exper.Biol.& Med. *58*:11 (Jan.) 1945

ALDIAZOL

Microcrystalline Sulfadiazine and Sulfathiazole in an alkalizing vehicle containing Sodium Citrate and Sodium Lactate

The S. E. MASSENGILL COMPANY
Bristol, Tenn.-Va.
NEW YORK • SAN FRANCISCO • KANSAS CITY

SEMCO

PREMENOPAUSE



The premenopausal years—the late thirties and early forties—are often marred by many symptoms resembling those of the true climacteric. The origin of these symptoms may be obscure, however, because a history of changed menses or "hot flashes" is lacking. In such instances, a therapeutic test with a potent injectable estrogen aids in diagnosis by differentiating between hormonal imbalance and other causes. It is essential, of course, that the estrogen chosen be one which always produces unequivocal improvement whenever estrogen deficit exists.

PROGYNON-B

(alpha-estradiol benzoate)

PROGYNON-B has been proven to be the most desirable injectable estrogen for the premenopausal therapeutic test. Its high and uniform potency assures rapid and complete amelioration of symptoms due to follicular hormone deficiency. Being non-toxic even in the highest therapeutic dosage range, PROGYNON-B will not produce side effects to vitiate clear differential diagnosis or distress the patient.

DOSAGE for therapeutic test: PROGYNON-B, 1.0 mg. (6000 R.U.), injected intramuscularly three times weekly for two weeks. The beneficial effects resulting from a positive test may be continued subsequently by injecting 1.0 mg. (6000 R.U.) or 0.33 mg. (2000 R.U.) once weekly, depending on the individual degree of estrogen deficiency.

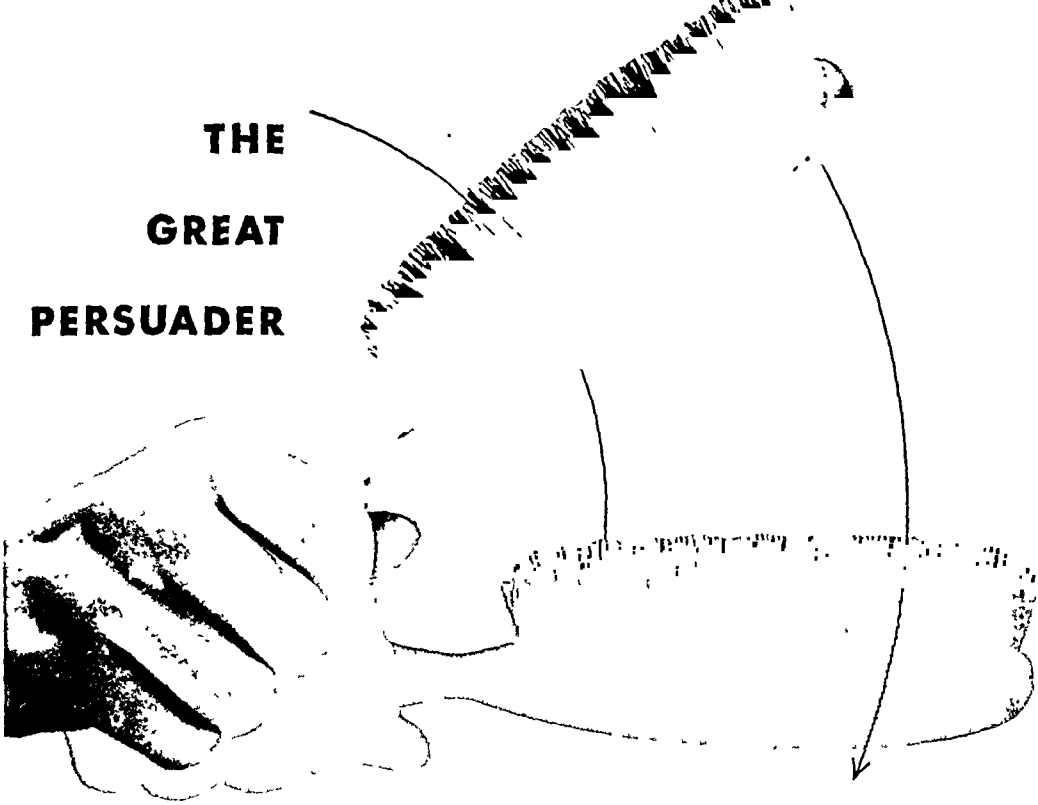
PACKAGING: PROGYNON-B is available in ampules of 1 cc. containing 0.03 mg. (500 R.U.), 0.16 mg. (1000 R.U.), 0.33 mg. (2000 R.U.), 1.0 mg. (6000 R.U.) and 1.66 mg. (10 000 R.U.) in boxes of 3, 6, 50 and 100. Vials of 10 cc. (0.166 mg. per cc.) in boxes of 1 and 6.

Trade-Mark PROGYNON-B—Reg. U. S. Pat. Off.

Schering CORPORATION • BLOOMFIELD, N. J.

IN CANADA, SCHERING CORPORATION LIMITED, MONTREAL

THE GREAT PERSUADER



All too often irate parents resort to a "good licking" for children who refuse to eat. The therapeutic merits of such a procedure are of course not medically recognized, since anorexia often is more than a stubborn personality defect.

More effective than punishment is the stimulation of B complex on appetite. 'Ryzamin-B' No. 2 has proved especially effective because of a pleasant taste-appeal which children relish. Containing the *natural* B complex as a concentrate of Oryza sativa (American rice) polishings, 'Ryzamin-B' No. 2 is also potently fortified with synthetic B factors. Children enjoy its rich, honey-like flavor any way it is given—right from its special measuring spoon, as a delicious spread with jam or peanut butter, or dissolved in milk, fruit juice and other beverages

'RYZAMIN-B' BRAND RICE POLISHINGS CONCENTRATE **NO. 2**

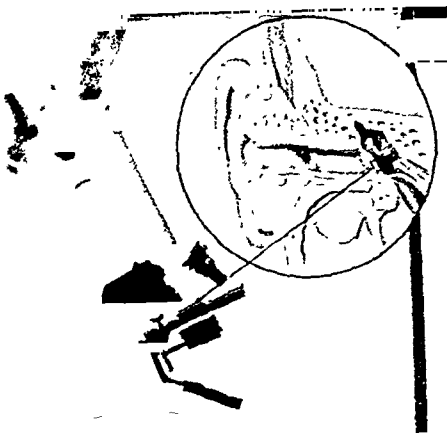
WITH ADDED THIAMINE HYDROCHLORIDE, RIBOFLAVIN AND NICOTINAMIDE

TUBES OF 2 OZ AND BOTTLES OF 8 OZ

'Ryzamin B' registered trademark

BURROUGHS WELLCOME & CO (U S A) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

PIONEERS in Research . . . and Leadership thru the years in combating



DOHO in realizing the need for a potent, topical, well tolerated ear medication, yet mindful that no one formula could be suitable for all conditions . . . devoted every facility and scientific resource to the development and perfection of AURALGAN and OTOSMO-SAN. Each has its sphere of usefulness . . . each has been tested and clinically proven in many thousands of cases. *Reprints and substantiating data sent on request.*

EACH A SPECIFIC . . . both effective!

Auralgan
IN ACUTE OTITIS MEDIA

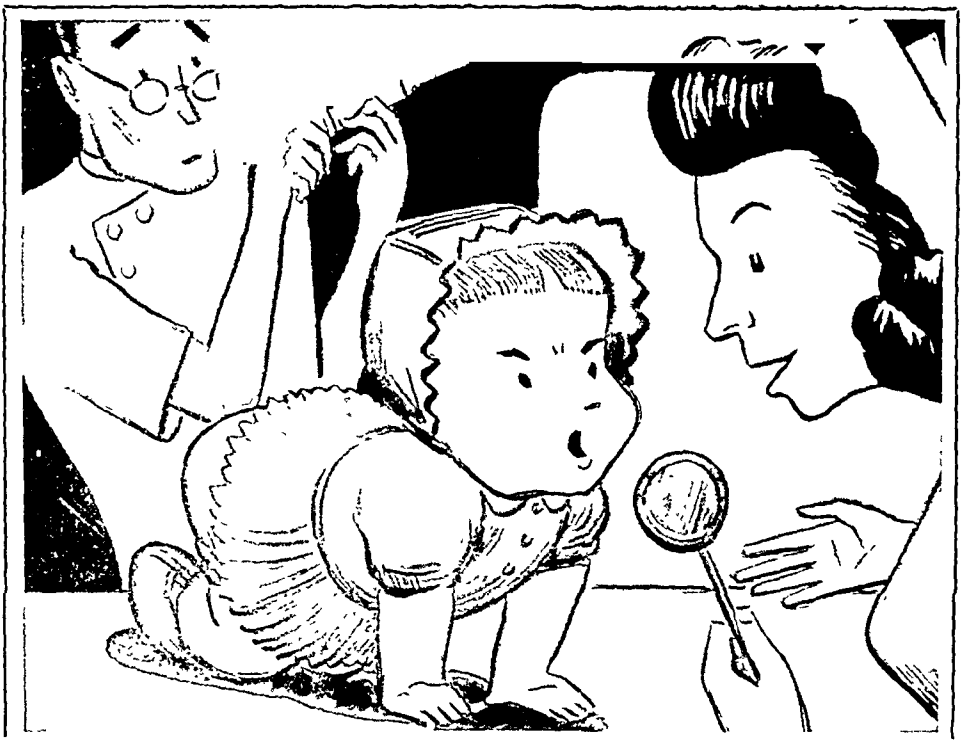
is a scientifically prepared, completely water-free Glycerol (DOHO) having the highest specific gravity obtainable, containing antipyrine and benzocaine . . . which by its potent decongestant, dehydrating and analgesic action provides effective relief of pain and inflammation.

O-TOS-MO-SAN
IN CHRONIC SUPPURATIVE OTITIS MEDIA, FURUNCULOSIS AND AURAL DERMATITIS

is not just a mere mixture, but a scientifically potent chemical combination of Sulfathiazole and Urea in AURALGAN Glycerol (DOHO) base . . . which exerts a powerful solvent action on protein matter, liquefies and dissolves exuberant granulation tissue, cleanses and deodorizes, and tends to exhilarate normal tissue healing in the effective control of chronic suppurative otitis media.

Literature and samples on request

THE DOHO CHEMICAL CORPORATION
New York 13, N. Y. • Montreal • London



"Don't try to bribe me—I want D-P-T*"

Maybe babies don't cry for them—but they will be better protected with Cutter's combined vaccines. And run less risk of painful reactions, too! Here's why:

1. *Phase I pertussis organisms* for D-P-T are *grown on human blood* —to assure high antigenicity of organisms, and to avoid the danger of anaphylactic shock from heterologous animal protein.
2. *Diphtheria and tetanus toxoids* are so *purified* that every cc. contains well over a single human dose each.
3. *Concentration of toxoids*—plus 40 billion Phase I pertussis organisms per cc.—permit a dosage schedule of only 0.5 cc., 1 cc., 1cc.

You'll find advantages in another Cutter product, too—D-P-T *(Alhydrox)*. It provides higher immunity levels than alum precipitated vaccines. Cuts to a minimum such side reactions as persistent nodules and sterile abscesses. And presents less pain on injection because of a more physiologically normal pH.

Choose D-P-T—Plain or Alhydrox—you'll appreciate them in your practice.

★ *Cutter's brand of combined diphtheria, pertussis and tetanus antigens.*

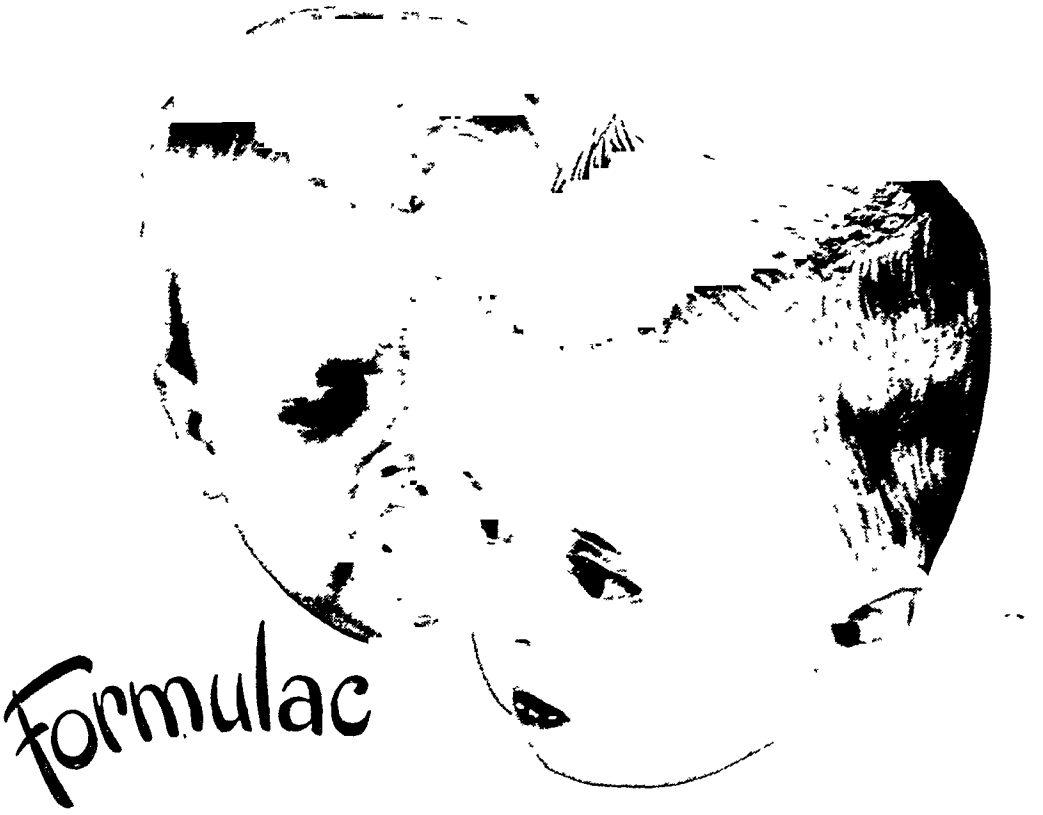
Cutter Laboratories, Berkeley 1, California
Chicago • New York



Need an "answer book" for parents in your practice? Write for gift copies of Cutter's new booklet— "How to Present Diseases of Children."

CUTTER

Fine Biologicals and
Pharmaceutical Specialties



is vitamin-fortified

A product of National Dairy research, FORMULAC Infant Food is fortified with all the vitamins known to be necessary for adequate infant nutrition. Incorporating the vitamins *into the milk itself* reduces the risk of human error or oversight in supplementary administration.

FORMULAC is a concentrated milk in liquid form. It contains sufficient vitamins of the B complex, Vitamin C in stabilized form, Vitamin D (800 U.S.P. units), copper, manganese and easily assimilated ferric lactate—rendering it an adequate formula basis both for normal and difficult feeding cases. *No carbohydrate has been added to* FORMULAC. It contains only the natural lactose found in cow's milk.

FORMULAC is promoted ethically, to the medical profession alone. It has been tested clinically, and proved satisfactory in promoting normal development and growth. Manufactured under the Sealtest system of quality control, FORMULAC is available in drug and grocery stores from coast to coast.

DISTRIBUTED BY KRAFT FOODS COMPANY

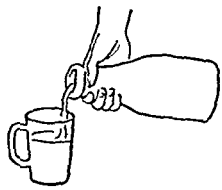
NATIONAL DAIRY PRODUCTS COMPANY, INC.

NEW YORK, N.Y.

• For further information about FORMULAC, and for professional samples, drop a card to National Dairy Products Company, Inc., 230 Park Avenue, New York 17, N. Y.



for those **sensitive** to the proteins in milk...







• When children (infants and adults, too) are unable to tolerate the animal proteins in cow's milk, MULL-SOY—the emulsified soy concentrate—is the replacement of choice. It is highly palatable, and easily digestible, without the offending proteins of animal origin.

• MULL-SOY is a biologically complete vegetable source of all essential amino acids. In standard 1:1 dilution, it also provides the other important nutritional factors of fat, carbohydrate and minerals in quantities that closely approximate those of cow's milk.

• To prepare MULL-SOY, simply dilute with equal parts of water.

BORDEN'S PRESCRIPTION PRODUCTS DIVISION
350 MADISON AVENUE, NEW YORK 17, N. Y.
In Canada write The Borden Company, Limited, Spadina Crescent, Toronto

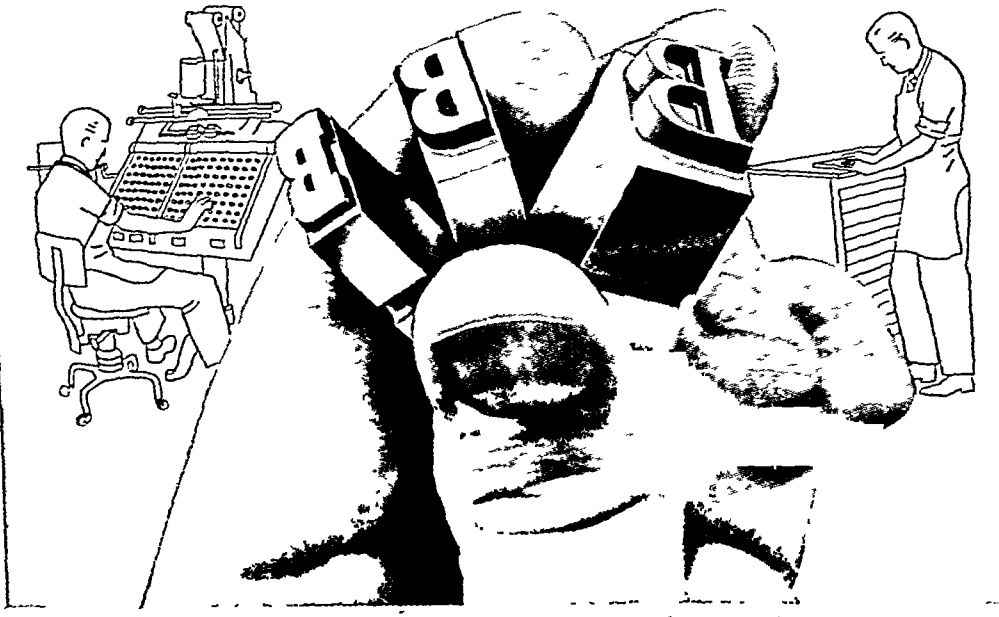
mull-Soy



MULL SOY is a liquid hypoallergenic food prepared from water, soy flour, soy oil, dextrose, sucrose, calcium phosphate, calcium carbonate, salt and soy lecithin, homogenized and sterilized
Available in 15½ fl oz cans at drug stores everywhere

when milk becomes "forbidden food"

A TYPE FOR EVERY NEED



Just as the typographer has a "type for every need," there is a "BEMINAL" preparation to meet the individual requirements of each patient for "B" therapy. Available in five dosage forms, "BEMINAL" satisfies the need for both prophylactic treatment in minor nutritional deficiencies and greater potency in the manifestly more advanced cases.

"Bemінal" **Forte** with VITAMIN C (Capsules) No. 817. Highly potent preparation of B factors with vitamin C.

"BEMINAL" **Forte** INJECTABLE Dried No. 495. High concentration of important B factors for intensive therapy.

"Bemінal" GRANULES No. 925. Vitamin B complex in a dry, palatable, and readily soluble form.

"BEMINAL" with IRON and LIVER (Capsules) No 816. Ferrous carbonate, liver and B complex for the treatment of iron deficiency anemias.

"BEMINAL" TABLETS No. 815 For the prophylaxis and treatment of mild or subclinical vitamin B complex deficiencies.

"BEMINAL"®

FOR "B" THERAPY

AYERST, McKENNA & HARRISON Limited

22 EAST 40TH STREET, NEW YORK 16, N.Y.

HOW TO TAKE THE COAXING OUT OF

Convalescent Diets!

The nourishing foods a convalescent child or adult needs can be given interesting variety with Knox Gelatine... delicious puddings, molded salads and cooling desserts, to tempt a flagging appetite.

There are so many different Knox recipes and into all of them go good home ingredients full of natural vitamins, *real* flavor. You see, Knox Gelatine is totally different from artificially flavored gelatine dessert powders. You flavor Knox with fresh fruits and juices with their desirable vitamin content. Knox is all protein—no sugar.

FOR FREE BOOKLET, "Feeding the Patient," write to Knox Gelatine, Dept. 00, Johnstown, N. Y.

KNOX GELATINE

ALL PROTEIN • NO SUGAR



CEREVIM

a first among first foods

we think vegetables are good but many babies don't agree



During that unhappy time when mothers are struggling to educate their off-spring in a well-rounded diet, a bowl of CEREVIM can often bring peace.

You can assure anxious mothers that it's no calamity if babies skip a full meal occasionally as long as they take CEREVIM regularly. For a single one-ounce serving of this tasty cereal *supplies the recommended daily allowance of iron, thiamine, riboflavin, and niacin for children up to three years of age.**

*Recommended Dietary Allowances, National Research Council, 1945.

Trade-Mark CEREVIM—Reg U.S Pat. Off.

LEDERLE LABORATORIES DIVISION

AMERICAN CYANAMID COMPANY • NEW YORK 20, NEW YORK

Publishers Approved Binding Service



6 issues per volume, January to June or July to December, inclusive.

$2.50

Journal of Pediatrics

Beautifully Bound in Best Grade Washable Buckram
Your Name on the Front Cover

●

Special arrangements have been made by THE C. V. MOSBY COMPANY whereby subscribers can have their copies economically bound to the publisher's specifications.

You can now have your *Journal of Pediatrics* bound in best grade of washable buckram with your name imprinted in genuine gold on the front cover.

These personalized and handsomely crafted books, distinctively designed, will prove an asset to your home or office library. They will be a constant source of reference for many years to come.

Your bound volumes will be returned—transportation PREPAID. Ship journals express or parcel post PREPAID, with check or money order made payable to

THE BOOK SHOP BINDERY

Creators of Distinctive Bindings Since 1895

308 WEST RANDOLPH STREET CHICAGO 6, ILL.

SYMBOLS OF SIGNIFICANCE

NUTRITIVE CAPSULES

L.M.P. - June 15
E.D.C. - March 22

Gestation . . .

. . . from conception until the actual date of confinement—places unique demands upon the mother. Not the least important of these are accentuated mineral and vitamin needs.

To spare the mother the burdens of cumbersome supplementation and the dangers of nutritional inadequacy, NUTRITIVE CAPSULES afford in convenient form efficacious dosages of Dicalcium Phosphate (Anhydrous), Ferrous Sulfate, Vitamin B_1 (Thiamine Hydrochloride), Vitamin B_2 (Riboflavin) and Vitamin D. Similarly, NUTRITIVE CAPSULES prove highly advantageous to the convalescent patient and the malnourished.



NUTRITIVE CAPSULES are one of a long line of Parke-Davis preparations whose service to the profession created a dependable symbol of therapeutic significance—MEDICAMENTA VERA.

NUTRITIVE CAPSULES are supplied in bottles of 100 and 1000.

PARKE, DAVIS & COMPANY • DETROIT 32, MICHIGAN

MEDICAMENTA VERA
P D & CO.



Still the fatal first month

Despite the gratifying dramatic decline in infant mortality, *there is still only slight reduction in the number of deaths of infants under one month.* During these critical 30 days, among the important precautions to be exercised is the right start on the right foods.

'Dexin' has proved an excellent "first carbohydrate". Because of its high dextrin content, it resists fermentation by the usual intestinal organisms, tends to hold gas formation, distention and diarrhea to a minimum, and promotes the formation of soft, flocculent curds facilitating digestion of milk proteins.

Easily prepared in hot or cold milk, 'Dexin' brand High Dextrin Carbohydrate is palatable but not too sweet. 'Dexin' *does* make a difference.

'Dexin' Reg. Trademark

'Dexin' BRAND HIGH DEXTRIN CARBOHYDRATE

Composition—Dextrins 75% • Maltose 24% • Mineral Ash 0.25% • Moisture 0.75% • Available carbohydrate 99% • 115 calories per ounce • 6 level packed tablespoonfuls equal 1 ounce • Containers of twelve ounces and three pounds • Accepted by the Council on Foods and Nutrition, American Medical Association.

Literature on request

BURROUGHS WELLCOME & CO (U.S.A.) INC., 9 & 11 East 41st St., New York 17, N.Y.



The importance of flavor in establishing good eating habits

Psychological—Physiological

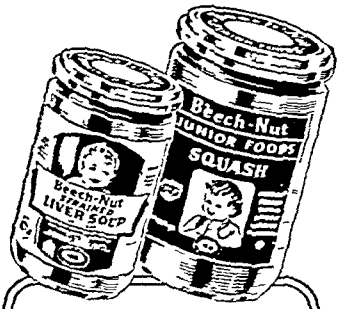
Pleasurable satisfaction in the taste of food is a definite factor in, and an aid to, digestion. Many babies are particular about the quality and taste of the foods offered them.

Flavor cultivates appetite

For the infant's nutritional benefit and eating pleasure, Beech-Nut offers a group of foods the fine flavor of which is solely dependent on careful selection and precise packing methods.

Standards of care

These include the expert selection of the best in fruits, vegetables and meats. Cooking is carefully controlled to retain natural food values, as well as flavor in high degree.



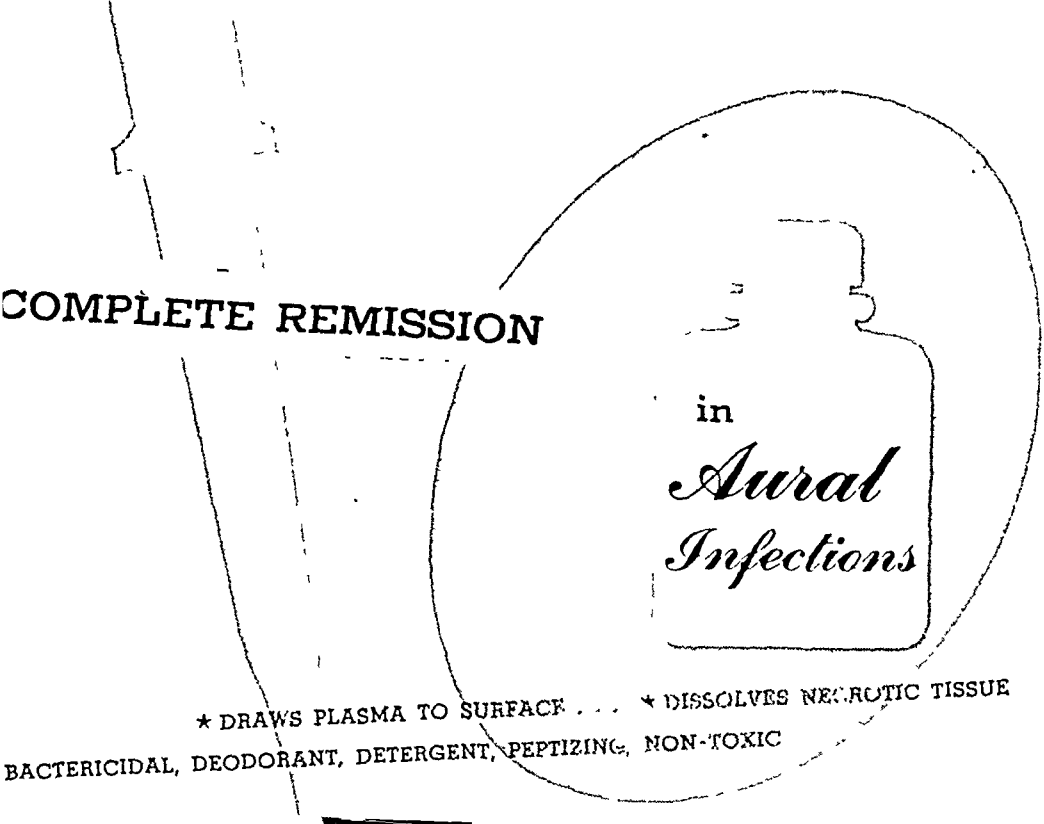
ALWAYS PACKED IN GLASS JARS

Easy to open · Easy to close
Easy to keep

Beech-Nut
STRAINED & JUNIOR
Foods *for* Babies

A complete line of meat and vegetable soups, fruits, vegetables and desserts.

Beech-Nut high standards of baby food production and all Beech-Nut baby food advertising have been accepted by the Council on Foods and Nutrition of the American Medical Association.



Glycerite of Hydrogen Peroxide *ipc*
With Carbamide

Clinical studies concerned with the use of Glycerite of Hydrogen Peroxide in the treatment of chronic purulent otitis media demonstrated seventeen of twenty-nine patients in complete remission in 14 days and the remainder by the 38th day. The patients studied presented conditions existent for periods of 2 weeks to over 40 years. Previous treatment by the usual therapeutic means, including tyrothricin or penicillin, was ineffective in all cases.

★ BIBLIOGRAPHY

Arch. Otolaryngol., 43 605, 1946.
E., E., N., & T. Mo., 26 27, 1947.
Laryngoscope, 56 556, 1946.
New Eng. J Med., 234 468, 1946.
Annals of Allergy, 4 33, 1946.
J. A. Ph., A., (Sc. Ed.) 35-304, 1946.

Literature on request.

Constituents:

Hydrogen Peroxide 1.446%, Urea (Carbamide) 2.554%, 8 Hydroxyquinoline 0.1%. Dissolved and stabilized in substantially anhydrous glycerol . . . q.s. ad. 30cc.

Available on prescription in one-ounce bottle with dropper.

Administration One half dropperful two to four times daily.

International **PHARMACEUTICAL CORPORATION**

132 NEWBURY STREET, BOSTON 16, MASSACHUSETTS

Announcing a new way to

stop that night cough

EFFECTIVE • PALATABLE • WELL-TOLERATED

Sedulon is a new, non-narcotic drug which is so effective that it can often be given in place of codeine. Developed after prolonged studies by the Roche Research Laboratories, Sedulon has a gentle sedative action which is remarkably effective even in stubborn cough. Clinical experience indicates that Sedulon is particularly useful for the relief of annoying night cough. The pleasant flavor of Syrup Sedulon 'Roche' appeals to young and old patients alike. Available in 4-oz and 1-pt bottles. For samples and descriptive literature write to Department C-3.

T.M.—Sedulon—Reg. U.S. Pat. Off. Chemically, Sedulon is 3,3-diethyl-2,4-dioxo-piperidine.

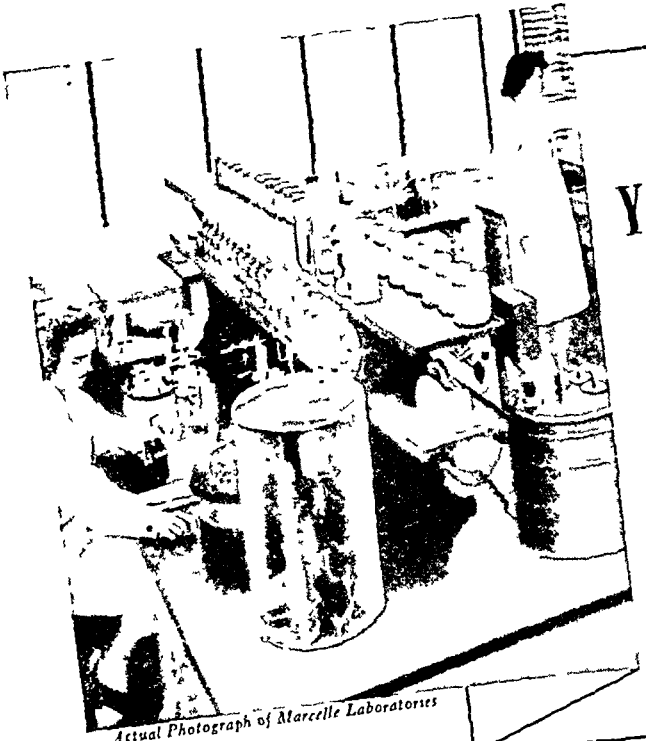
HOFFMANN-LA ROCHE INC • ROCHE PARK • NUTLEY 10 • NEW JERSEY



syrup sedulon *'Roche'*

℞

Syrup Sedulon Roche——5 iv
Sig. One teaspoonful every 2 hours; one tablespoonful at bedtime
(For night cough in adults)



Actual Photograph of Marcelle Laboratories

Your treatment is protected through RESEARCH



IN ALLERGIES, cosmetics may be a causative or contributing factor Marcelle hypo-allergenic Cosmetics are widely prescribed by physicians because they are assured of the highest possible effectiveness of their regimen First, because they realize that known allergens have been eliminated or reduced to a minimum through constant research Secondly, their patients appreciate the delightfully soothing beauty care provided by Marcelle hypo allergenic Cosmetics and faithfully follow the recommended treatment You are cordially invited to visit our laboratory

Acceptable for advertising in publications of the American Medical Association for 15 years

Marcelle HYPO-ALLERGENIC COSMETICS

MARCELLE COSMETICS, INC.
1741 N. WESTERN AVE., CHICAGO 47, ILL.

Q: Is any germ a "good" germ?

A: *Yes—wheat germ is a "good" germ—it's the richest cereal source of thiamine (vitamin B_1) and provides protein of high biological value.*

Hot Ralston has EXTRA Wheat Germ

Yes, *extra* wheat germ is added to this whole wheat cereal—makes it 2½ times as rich in wheat germ as whole wheat. That's why...

Hot Ralston has EXTRA Thiamine and Protein

—A good reason why you should recommend Hot Ralston as an extra-nourishing food for children and adults.

TWO KINDS OF HOT RALSTON

COOKS IN 5 MINUTES

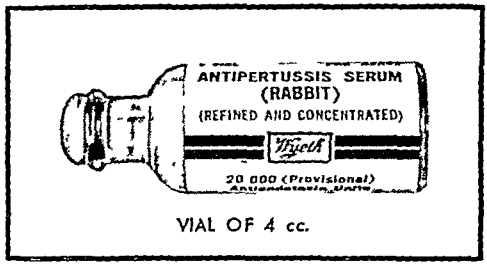


COOKS IN 10 SECONDS



Both natural whole wheat—both with extra wheat germ—both delicious.

RALSTON PURINA COMPANY
Checkerboard Square St. Louis 2, Missouri



VIAL OF 4 cc.

A Long Step Forward

in the *Specific Treatment* of whooping cough

ANTIPERTUSSIS SERUM (Rabbit)

WYETH

HIGHLY CONCENTRATED...PRECISELY STANDARDIZED

Each dose...4 cc. ...contains therapeutic concentrations of antibodies and not less than 20.000 units of antiendotoxin.

Inhibits growth of Haemophilus pertussis and neutralizes its endotoxin...Imparts a temporary immunity to contacts, modifies and shortens the active disease . . . Tends to prevent complications.

PERTUSSIS ENDOTOXOID-VACCINE Wyeth, for active immunization, contains 15 billion killed H. pertussis and 140 provisional units of pertussis endotoxin per cubic centimeter, converted to *endotoxoid*
The endotoxoid component stimulates production of antiendotoxin, and the vaccine content provides antibacterial factors against the invading organism itself

Pertussis Endotoxoid-Vaccine
Wyeth
Vials of 6 and 24 cc.

WYETH INCORPORATED Wyeth PHILADELPHIA 3, PA.



area of agreement

Pediatricians and geriatricians agree upon the need for prompt control of cough because its effects are particularly exhausting upon the child and the aged.



the characteristic response to Pyridium therapy

The prompt symptomatic relief provided by Pyridium is extremely gratifying to the patient suffering from distressing urinary symptoms such as painful, urgent, and frequent urination, nocturia, and tenesmus.

Pyridium, administered orally in a dosage of 2 tablets *t.i.d.*, will promptly relieve these symptoms in a large percentage of ambulant patients, thereby permitting them to pursue normal activities without undue discomfort.

Acting directly on the mucosa of the urogenital tract, this important effect of Pyridium is entirely local. It is not associated with or due to systemic sedation or narcotic action.

Therapeutic doses of Pyridium may be administered with virtually complete safety throughout the course of cystitis, pyelonephritis, prostatitis, and urethritis. • LITERATURE ON REQUEST •

REG. U. S. **PYRIDIUM** PAT. OFF.

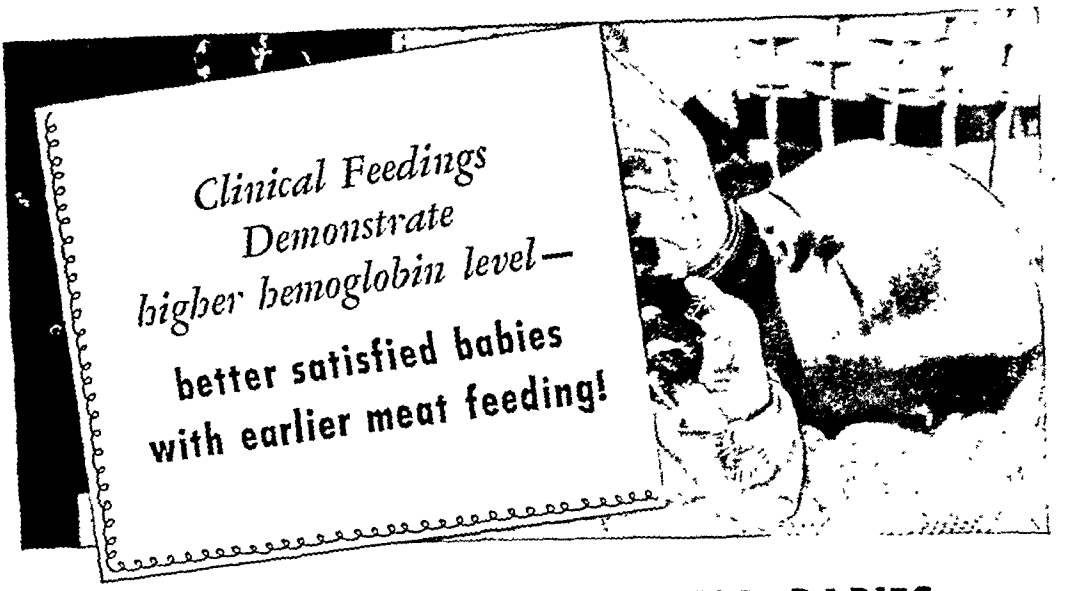
(Phenylazo alpha-alpha-diamino pyridine mono hydrochloride)

MERCK & CO., Inc. RAHWAY, N. J.

Manufacturing Chemists

In Canada: MERCK & CO., Ltd., Montreal, Que.

PYRIDIUM is the United States Registered Trade-Mark of the product manufactured by the Pyridium Corporation. Merck & Co., Inc., Sole Distributors.



SWIFT'S STRAINED MEATS FOR BABIES



That infants *thrive* on meat has recently been demonstrated in clinical feedings to a group of babies only six weeks old. Swift's Strained Meats—specially prepared for earlier meat-feeding—were mixed with the infants' formula in this study. The infants who received Swift's Strained Meats were healthier, better satisfied and had better hemoglobin level than the control group. Here is a summary of the results:

1. *No adverse symptoms occurred when the protein intake of 18 bottle-fed infants was increased by 25% by the addition of approximately an ounce of strained meat to the formula when the infants were 6 weeks old.*

2. *The observations of the pediatrician and the nursing staff suggest that the general well-being of the infants that received the meat supplement was better than that of the control group.*

3. *This preliminary study indicates that strained meat added to the formula of bottle-fed infants not only checks the drop in hemoglobin, characteristic of this age, but actually promotes hemoglobin and cell formation.**

100% meats—specially prepared for earlier meat-feeding

Swift's Strained Meats may be fed as soon as any other solid food. They provide an abundance of complete, high-quality proteins, needed to support the infant's rapid growth. Meat is also one of the richest sources of thiamine, niacin, riboflavin and minerals, notably iron. When you recommend Swift's Strained Meats you know mothers can follow your feeding instructions accurately, *easily*. These 100% meats are specially prepared, soft and smooth, ready to heat and serve! Swift's Strained Meats differ in both taste and texture from baby's other solid foods—help him form nutritionally sound eating habits.

*MEAT IN THE DIET OF YOUNG INFANTS
Ruth M. Leverton, Ph.D. and George Clark, M.D.
J. A. M. A. 134:1215 Aug. 19, 1947

Also SWIFT'S DICED MEATS for older babies

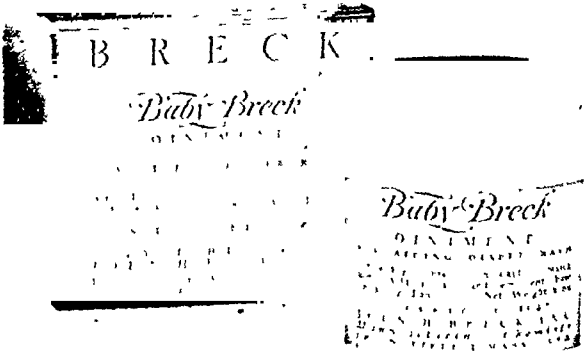
Tiny, bite-size cubes of tender meat—firm enough to encourage chewing and help prevent lazy food habits. Swift's Diced Meats are easier for babies and young children to digest than heavy table foods.

For further information about Swift's Strained and Swift's Diced Meats, write Swift & Company, Dept. B.F., Chicago 9, Ill.

All statements made in this advertisement are accepted by the Council on Foods and Nutrition of the American Medical Association.

5 STRAINED • 6 DICED MEATS
BEEF LAMB PORK
VEAL LIVER HEART
Ready to heat and serve

SWIFT & COMPANY • CHICAGO 9, ILLINOIS



Baby Breck

OINTMENT

For Aiding Diaper Rash

Baby Breck Ointment was made to relieve mild cases of diaper rash. Mothers often bring this common problem to their child's physician. Baby Breck Ointment may be recommended for its mildness and effectiveness, especially during the long night period.

Active ingredients—zinc oxide, starch, boric acid in a bland emollient base containing lanolin.

JOHN H BRECK INC · MANUFACTURING CHEMISTS · SPRINGFIELD 3 · MASSACHUSETTS
CANADIAN ADDRESS · 310 SLATER STREET · OTTAWA



REGARDLESS of the many other considerations involved. only a well-nourished baby can be a happy baby. To this end, Libby's Baby Foods can contribute considerably. Homogenized by an exclusive process, Libby's are modified so that cellulose cell capsules are ruptured and nutrients are dispersed homogeneously through the food mass.

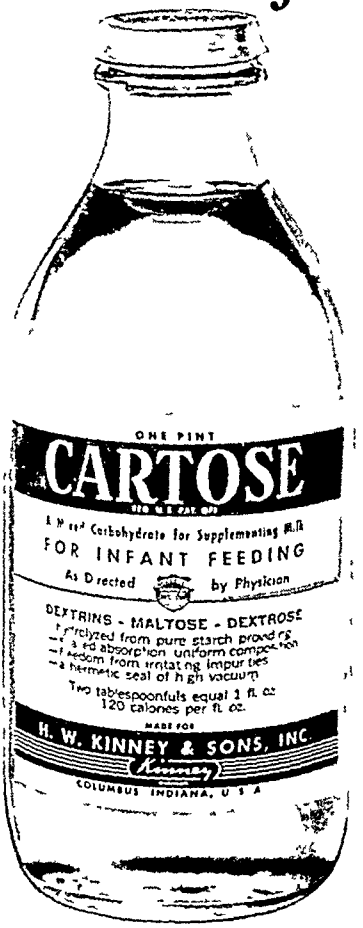
Nutrient availability is enhanced and texture is changed to such satin-smoothness that Libby's Baby Foods have been fed as early as the sixth week of life. Thus the infant is provided with the many valuable nutrients contained in the wide variety of infant foods made available by Libby.

Beets • Carrots • Green Beans • Peas • Spinach • Squash • Vegetable Soup • Mixed Vegetables • Garden Vegetables • Liver Soup • Vegetables with Bacon • Vegetables with Beef and Barley • Vegetables with Lamb • Apples and Apricots • Apples and Prunes • Apple Sauce • Apricot-Farina • Peaches • Peaches-Pears-Apricots • Pears and Pineapple • Prunes (with Pineapple Juice and Lemon Juice) • Custard Pudding

Libby, McNeill & Libby • Chicago 9, Illinois



Consistent Performance..



CARTOSE* has won steadily increasing recommendation by physicians because it has always stood the test of performance as a carbohydrate milk modifier for infant feeding.

Babies thrive on CARTOSE because.

CARTOSE is well tolerated; gastrointestinal discomfort is minimized by its mixed carbohydrate content;

CARTOSE is liquid, facilitating rapid, exact formula preparation;

CARTOSE is compatible with any formula base—fluid, evaporated, or dried milk;

CARTOSE is pure; it is prepared and bottled by a sterilizing process.

SUPPLIED: In clear glass bottles containing 1 pt. Two tablespoonfuls (1 fl. oz) provide 120 calories. Available through recognized pharmacies only.

ACCEPTED Council on Foods and Nutrition A.M.A.

CARTOSE
REG. U.S. PAT. OFF.

A Mixed Carbohydrate

*The word CARTOSE is a registered trademark of H. W. Kinney & Sons Inc.

— H. W. KINNEY & SONS, INC. — Kinney REG. U.S. PAT. OFF. — COLUMBUS, INDIANA —



BABY'S FIRST CHRISTMAS

This is the moment parents cherish—when tiny eyes sparkle at the glory of a tree, and small hands reach in wonderment for baby's first gifts. Mothers know glowing good health is the most precious of these gifts, and countless babies have been helped to attain it by a steady diet of White House Milk. Homogenized for easy digestibility, smooth, rich White House is generously fortified with pure vitamin D_3. There's none better for infant feeding!

WHITE HOUSE MILK

There's None Better

400 U.S.P. UNITS OF PURE VITAMIN D_3 PER PINT

SOLD AND GUARANTEED* BY A&P

Mother's first thought for infant feeding!



A&P

*Satisfaction Guaranteed or money back.

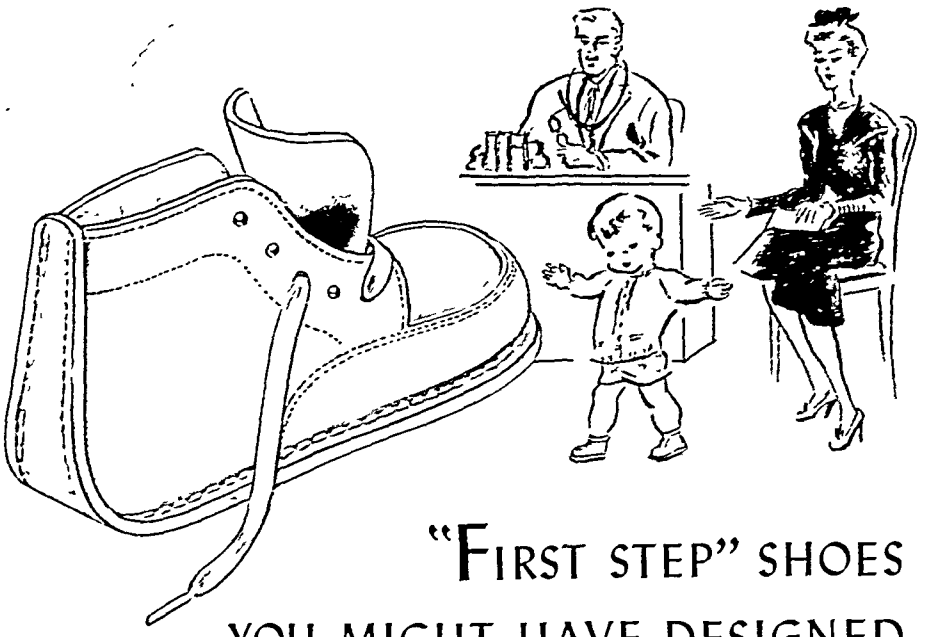
Not Connected With Any Company Using A Similar Name Or Brand.

the perspective or hide the view altogether, and cause them unconsciously to think of how to safeguard personal comfort and profit rather than of the best interests of the people whom they serve.

If I remember correctly, in the brief time when the present Duke of Windsor was King of England, he visited the slums to see with his own eyes the housing conditions, and on that occasion made a profound remark which evoked great praise in the British press. The remark was: "Something must be done about it." I think we are all convinced that something must be done about the present state of medical care, but what form that *something* should take and how that *something* should be put into effect have stirred up great conflicts of opinion.

Why is it so necessary to change the present system of medical care? The present system has developed spontaneously to fit the distribution of money, not the distribution of medical need; it does not meet the medical need and, no matter how it might be extended, could never meet the medical need in one thousand years, for the reason that it operates on an incorrect principle. Another reason is that its fee-for-service system of remuneration keeps it from taking on a preventive character because the person who pays a fee to his physician at each visit goes to him only when sick. Another reason is that the science of medicine has developed with such strides that the requirements of medical care have changed, and groups of minds must now collaborate, since single minds can no longer be masters of more than small parts of medical knowledge. Moreover, as in industry, laboratories and machines of great complexity have become essential. As the result of all this, the family physician who was once so adequate can no longer meet all necessary services by himself. He and his patients must have available specialists, x-ray service, laboratories. This transformation of medical care into something far more complex and beneficial has, unfortunately, so increased its cost that it has risen out of reach of the majority of people. Without presenting the evidence, it is sufficient to say that the present happy-go-lucky, haphazard system of medical care has become outmoded and out of joint and is hopelessly insufficient and inadequate to meet the health requirements of the nation. This is one side of the picture. The other is that the great advances in science and industry have made possible higher standards of living. Moreover, the methods of science have been employed as never before in economics and sociology, with the result that the facts of living, including health, have been studied and are intimately known. The knowledge thus gained has brought to pass a greatly intensified social consciousness and feeling of social responsibility, in brief, has led to an intensification of democracy in the finest sense of the word, meaning, thereby, the general acceptance of the principle that individuals have equal rights to fair shares of the comfort and benefits of life. Finally, large groups of the population, labor and farm groups in particular, have awakened to the idea that a new kind of medicine has come into being, and on all sides we see them organizing in the attempt to secure it. As a boy, I once heard President McKinley say in a campaign speech that he kept his ear close to the ground so that he could hear the voice of the American people. In reality, I suspect he kept it about five feet, four inches from the ground so

JUMPING-JACKS . . . FOR CHILDREN 6 MONTHS TO 3 YEARS OLD



"FIRST STEP" SHOES YOU MIGHT HAVE DESIGNED



JUMPING-JACKS DO THESE SIX THINGS:

1. Make the child walk straight by holding heel bones in correct position.
2. Prevent ankles from turning in or out.
3. Develop foot and leg muscles, no stiff counters or shanks
4. Hold their shape until outgrown . . no heel or striking edge to wear off
5. Provide proper flexibility, it's like walking barefoot
6. Encourage the child to step out confidently.

As a pediatrician, you know what first walking shoes should do for the normal baby foot. If you were also an expert shoe designer, you might well accomplish your six objectives (as listed at left) as we have done . . . with an extension sole running all the way from the toe up the heel to the shoe-top, the exclusive, patented feature that makes Jumping-Jacks unique.

Compare the orthopedic features of Jumping-Jacks with those of other shoes for children six months to three years old. Compare their quality, looks, and value. You'll find you can "prescribe" Jumping-Jacks with the same confidence you place in an accepted pharmaceutical.

JUMPING-JACKS
SOFT SHOES FOR HARD WEAR

Write for descriptive literature and name of your nearest dealer

VAISEY–BRISTOL SHOE CO., INC.
625 SO. GOODMAN STREET • ROCHESTER 7, N. Y.

that a new complete system, covering all the medical care needs of the entire population from "the cradle to the grave" ought to be imposed all at once, and the other, that it is wiser to proceed gradually. Those in favor of the more radical, drastic course are the supporters of the Wagner-Murray-Dingell Bill, S.1606, 1945. I shall not discuss this bill, but merely express the opinion that, if it were passed tomorrow, medical care would be thrown into unbelievable chaos, for the reason that we are not prepared for its sweeping changes. We lack the physicians, hospitals, organization, and the appropriate psychological attitude of the profession necessary for success, and I do not believe that the people of the country are psychologically prepared for the change. The enactment of the bill now would result in a debacle such as would have occurred if the invasion of Normandy had been attempted at the outset of the war without the necessary troops, training, transport, or equipment. Starting from scratch today, it would take fifteen years to become completely ready to meet the requirements of the bill. The dangers and difficulties of imposing revolutionary programs of medical care on an unprepared and inadequate medical organization are illustrated by the experiences in New Zealand, which I shall discuss later. Before leaving the Wagner-Murray-Dingell Bill, however, I wish to point out that the bill itself is open to serious criticism. For one thing, it is altogether too highly centralized and rigid. On the other hand, it has great merits: it represents a splendid attempt to work out a medical care program clearly and logically. Its completeness has made it a huge target. It is the product of a fine idealism, and it has had a magnificent influence in that it has made both the people and physicians think, and, in the case of organized medicine, fear and stir a little, for it has been handwriting on the wall. Finally, I express the opinion that in the end the form which medical care will take in this country will not be so far removed from the one outlined in the Wagner-Murray-Dingell Bill, but more decentralized and flexible. I say this because in the medically progressive countries of the world, the systems of medical care either in operation or projected are of that same pattern, and that pattern seems to be the one toward which the development of medical care is moving the world over.

The second division of thought, holding that it is wise for us to proceed slowly in the development of a medical care program, is supported by the great majority of physicians. The general thought underlying this view has just been expressed admirably by President A. E. Morgan of Antioch College (*Antioch Notes*, Feb. 14, 1947), "Social change should combine planning and improvising. We can tentatively plan limited phases of our common life, then, watching the effects and taking into account factors first overlooked, we can replan and revise. By this step-by-step process, more than by a grand sweep of theoretical planning, will come a new society." I, too, hold this view, but I am fully aware of the dangers inherent in the policy of trusting to a step-by-step process, and have no sympathy with the attitude of many of my medical friends who believe in doing nothing and trusting to "evolution," meaning thereby really doing nothing themselves to guide change but leaving the guiding to other people—lay groups, theorists, and politicians. Evolution means change through the dying



KNOW THIS SPECIALIST'S SPECIALTY, DOCTOR?

As you probably know, he's the Gerber's baby.

Maybe you know his specialty too.

It's pleasing doctors and babies at the same time. And that isn't as hard as it sounds.

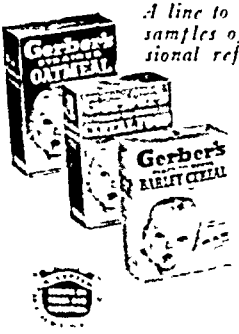
Take, for instance, Gerber's 3 Special Cereals.

Doesn't this please you, Doctor? Gerber's finely strained cereals are processed to retain essential nutritional values to a high degree. Also, they are rich with added iron, calcium and Vitamin B-complex.

And as for pleasing babies, we're specialists in preparing foods that *babies like better!* Right from the start and all during babyhood.

From Cereals through Strained and Junior Foods . . . there isn't a single one of all Gerber's 34 baby foods that isn't specially prepared to suit baby tastes.

A line to Gerber's, Dept. 2712-7, Fremont, Mich., will bring you samples of the three good-tasting Gerber's Cereals—plus professional reference cards.



Gerber's

FREMONT, MICH.—OAKLAND, CALIF.

Baby Foods

3 CEREALS 18 STRAINED FOODS 13 JUNIOR FOODS

child welfare centers has increased the interest of the public in child welfare and the care of sick children, and private pediatricians are sought in an ever-increasing degree. Such a development, however, presupposes that the state *medical activities are not so organized as to make private medical practice impossible. I fear that should medical activities be entirely controlled by the State, this would, in all certainty, lead to an unfortunate medical bureaucracy and also to an elimination of the personal contact between the patient and the doctor, which is a necessary condition for all good medical activity.* Such a socialization would mean, for the medical profession, a lowering of the standard which is in direct opposition to the interests of the country. *The duty of the State is, however, to organize medical care in such a manner that every person, irrespective of his income, can procure the best preventive and curative medical care.*

"In my opinion, the Swedish system shows very clearly that this can be done without undermining private medical practice."

Sweden has only 6,500,000 inhabitants (1945) and a geographical area smaller than France, and its population is homogeneous, disciplined, and organized. The problem there was simple as compared to ours. Their system is the result of an indigenous growth and cannot be copied, but it demonstrates that it is untrue and therefore sheer nonsense to think that State medicine and private practice systems cannot get on together successfully and happily or that State medicine need interfere with the free choice of physician or patient or with the physician-patient relationship. Moreover, it shows that through State planning and intervention, medical service can be made available to all the lower income groups, not just general practitioner but comprehensive medical care. Finally, the system is approved by the physicians themselves. Professor Wallgren (J. PEDIAT. 30: 361, 1947) states that, in general, the physicians choose State positions in preference to private practice because of their greater security. I ought to add that in the development of the medical care plan in Sweden organized medicine has played a great part, and with its almost dictatorial power, is instrumental and, perhaps, the main force in keeping the State system at its high efficiency. I believe that if our medical care system equalled Sweden's we would have no medical care problem.

The trouble with evaluating the Russian system is that, though we know it on paper, we do not know it in operation. On paper there are excellent features: One is that there is a highly developed screening process in the education system designed to insure that the physician class have exceptional ability, and there is further screening in order to separate out the most able for the superior medical positions. Another is that the state makes special provision for the continued education of the practicing physicians throughout their active lives. A third is that the State pays the expenses of the medical student during the years of preparation, so that medical education is open at all economic levels. So far as pregnant women and children are concerned, the health program is, perhaps, the most inclusive to be found anywhere. Of course, the system is rigid and centralized, but the test is what it does for the health of the people, and that I do not know.

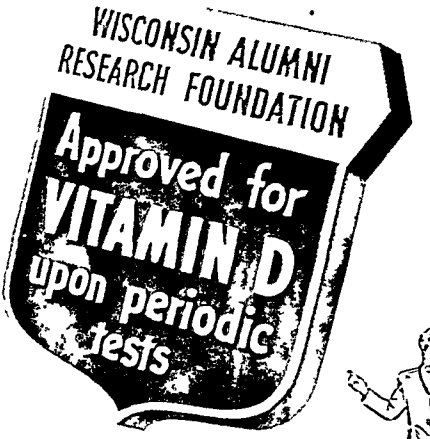


THE PRIVY SEAL OF EDWARD I

This was the seal that authenticated all the king's papers; it appeared on John Baliol's oath of fealty that brought Scotland in 1292 into the now British Empire and on the Charter that established the inalienable right of the people themselves to determine taxation (1297).

Seals of Authority

This seal, too, is a warranty assurance of the Vitamin D content of products bearing it. It guarantees that their products are regularly subjected to the Foundation Laboratory tests to make certain they meet its high standards and rigid requirements. For the past generation the medical profession has advised the patients to "look for the Foundation seal or mention of the Foundation with full confidence."





WISCONSIN ALUMNI *Research* FOUNDATION
MADISON 6, WISCONSIN

Dingell Bill and is obviously written to appeal particularly to those to whom Federal control is anathema. The Taft Bill vests essentially all the authority in the individual states and reduces the Federal control nearly to impotence. If the Wagner-Murray-Dingell Bill was carefully thought through and made to face issues squarely, the Taft Bill is poorly thought out and avoids controversial issues, except for its central thesis of states rights, by passing them on to be fought out in the individual states. It contains provisions fraught with peril. For example, the Bill provides that "no plan or modification shall be disapproved because the (Federal) Director disapproves of the methods proposed." This would probably be interpreted as prohibiting the establishment of Federal standards which a state would have to meet in order to have its program approved. Virtually all of the existing health legislation requires the establishment and maintenance of personnel standards on a merit basis. Such Federal legislation has been a most important factor in taking politics out of health department appointments. Such a merit system clause was in the original Taft Bill introduced last year, but its omission is conspicuous in the present bill. The removal of this would open the State programs to political appointments. Proposals in the bill would allow the State to purchase services through any nonprofit, voluntary insurance program without any standards whatsoever. This would permit state and federal funds to be used to subsidize poorly operated voluntary insurance programs. Moreover, within the National Health Agency, seven units are established, one of which is the new Office of Medical and Hospital Care Services. This unit is administrated entirely separate from the United States Public Health Service and the Children's Bureau, i.e., the existing federal health agencies have been completely by-passed. This arrangement creates obstacles in the way of integrating preventive health services and curative health services. If the Bill were passed as it stands, there could be as many different systems of medical care as there are states. Some of these in the more progressive states would probably be very good, in some other states exceedingly poor, and all would be laid open to the possibility of political intrigue and inefficiency. If the passage of the Wagner-Murray-Dingell Bill would produce chaos in medical care, the Taft Bill would produce national confusion and perhaps corruption, and would establish an inefficiency which it might be impossible to overcome. It would span the way to the perpetuation and extension of the poor features of the present system of medical care without the assurance of new good features. The bill has other questionable provisions, one of which, having to do with a proposed extension of voluntary insurance to the medically indigent groups, I discuss later. But the bill is an example of careless thinking, or not thinking at all, and the fact that such a manifestly inferior measure could be proposed by our legislators is depressing to those who perceive how glorious a medical care program might be.

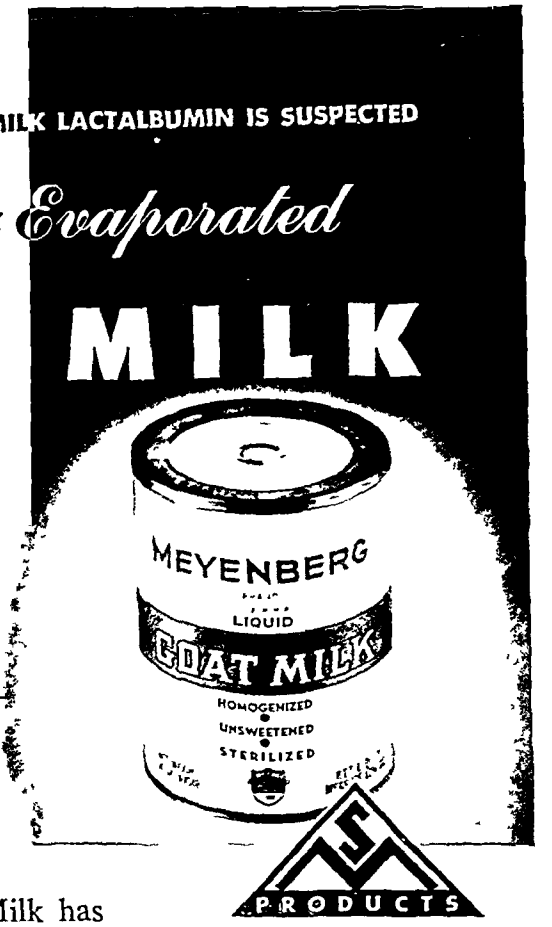
If it is wrong to give all the power in health legislation to the Federal Government, it is worse to place it all in the States and to have no national integration or coordination. In determining Federal and State relationships there must be a happy medium, in which the Federal Government establishes the general scheme and fixes minimum standards and the States have freedom to

WHEN SENSITIVITY TO COW'S MILK LACTALBUMIN IS SUSPECTED

Meyenberg Evaporated GOAT MILK

THE SUPERIOR-QUALITY
NATURAL MILK FOR
INFANTILE ECZEMA
AND DIFFICULT
FEEDING CASES

★



PRODUCTS

MEYENBERG Evaporated Goat Milk has gained outstanding national acceptance because it is *uniform*, *sterile* and *more palatable*. Prescribe or recommend Meyenberg whenever Cow's Milk allergy is suspected.

ACCEPTED AMERICAN MEDICAL ASSN.

Available in 14-ounce hermetically-sealed containers at all pharmacies

Now Available in Unlimited Quantities

Advertised only to the medical profession

SPECIAL MILK PRODUCTS, INC.

11500 TENNESSEE AVENUE · LOS ANGELES 25, CALIFORNIA

on the physicians and medical care resources of the country would still be great, but, perhaps, not too great, if time were granted for gradual adjustment.

Voluntary insurance has been taken up by the public like wildfire. The Blue Cross has now 24,250,000 subscribers, one-fifth of the population of the country, and prepayment medical care schemes such as those offered by medical and consumer groups have been extended considerably. But practically all voluntary insurance plans supply only partial medical care and that for only a limited period of time, in the sense that they cover only catastrophic illness and they do not provide for preventive medical care. These deficiencies are tremendous and keep the present plans far from meeting the total need of even those financially able to subscribe to them. Moreover, the plans are circumscribed by specific factors, such as occupation, economic status, residence, race. Nevertheless, the voluntary hospital insurance plans have been a great benefit, and their popularity indicates that the prepayment principle is generally desired. My medical friends who favor a hands-off waiting policy in regard to the development of medical care, and they are many, say to let voluntary insurance spread until it reaches everyone who needs it. But it is obvious that voluntary insurance can never spread to those who need it most, namely, to the low income groups, for they can never afford it. Furthermore, experience shows that plans offering complete medical coverage are necessarily too costly for most families, even those in the middle income groups. This accounts for the slow growth of voluntary medical service plans.

Returning now to the Taft Bill, it suggests undertaking to provide care for medically indigent persons through payment of insurance premiums with tax monies to all types of nonprofit voluntary plans. This would appear to be a policy based on fallacious reasoning, since it would involve inappropriate use of public money and would be unsound governmental procedure. It is a long-established principle that tax money should be expended by public agencies which are accountable to public officials representing the tax payers. This is a basic principle in the organization of our government, and hence a vital consideration against the Taft Bill proposal, aside from the fact, as I have pointed out above, that voluntary plans do not generally assume responsibility for meeting more than the very partial medical needs of their members. It seems astonishing that Senator Taft and his associates should have allowed a suggestion flaunting this time-honored principle to be introduced into the bill.

In any prepaid medical care program in which the care offered is to cover all requirements, the method of compensation of physicians is of great importance, and since our present medical care system is founded on a sliding fee-for-service remuneration, I shall briefly discuss the fee-for-service method of reimbursement and give the experiences with it reported from New Zealand. The fee-for-service method of payment of physicians has the great merit of stimulating competition, and this is its virtue. However, it has serious drawbacks: Most important, it stands in the way of preventive medical care, for the obvious reason, as previously mentioned, that, if a person has to pay a physician for his visit, he will not go to him until sick. The method interferes more than anything else with the naturalness of the patient-physician relationship. It is

The Journal of Pediatrics

VOL. 31 DECEMBER, 1947 NO. 6

Original Communications

CHANGING MEDICAL CARE IN OUR CHANGING NATIONAL LIFE

EDWARDS A. PARK, M.D.

BALTIMORE, MD.

SINCE I am addressing the pediatric section of the Academy, my audience may expect me to dwell on the social problems related to the care of children. But the care of children is just a part of the medical care problem of the population in general, and cannot be separated, although attempts were proposed in the Pepper Bill and in the minority report No. 1 of the New York Legislative Commission on Medical Care. Accordingly, I shall treat the topic in its general aspects. But before beginning, I must make an explanation: I shall speak as if the medical care problem pertained only to physicians, hospitals, medical schools, and the people, although I realize as much as anyone that it concerns also dentists, public health workers, nurses, social workers, laboratory workers, and all others whose duties are concerned with the maintenance of health and the problems of disease. I include the *people* with all the emphasis I possess, because the general policies under which public funds are expended must be developed fully in the interest of those who are to be served, the consumers of the medical care. Although, by universal admission, the sole authority in all matters pertaining to the applied science and art of medicine is the physician, in the economic aspect of medical care and, to a considerable extent, in the administrative, the consumers, i.e., the people themselves, have equal rights and are equally concerned with the physicians. How much medical care will cost, how it will be paid for, in what form it will be offered, and just how it will be carried out, these are matters vital to the people also. So, on every administrative board which decides or administers medical care plans at every level, federal, state, or local, the receivers of medical care, the people, must be adequately represented, together with the professional groups, the givers. I say this because I think that many physicians feel that they are the sole authorities, the only ones who really know what is best, and that the people should meekly receive what they decide to give. They forget that physicians are a vested interest and are instruments, not ends, and that selfish hopes and wishes loom large so as to blot out parts of

Read April 10, 1947, at the Centennial Meeting of the Section of Pediatrics of the New York Academy of Medicine.

Also published in the December issue of the *Bulletin of The New York Academy of Medicine*.

all maintained by salary and are the Cinderellas in the financial sense. . . . The quality of service suffers under the fee-per-service structure with its emphasis on quantity rather than quality. The tendency is toward quick superficial work and the avoidance of difficult subjects, times, and places."

According to the New Zealand system, the patient pays nothing for pharmaceutical benefits, but merely hands in his prescription and countersigns it when he receives his bottle. The total cost of pharmaceutical benefits has risen steadily and now reaches almost fantastic proportions. For the fiscal year 1945-1946, the cost to the government for payment to physicians was 1,633,514 pounds and the cost to the government for pharmaceutical benefits was 1,133,366 pounds, a figure only one-third less. The enormous proportions of the expenditure for pharmaceutical benefits reveals what must have happened, namely, the doctor reverted to the old method of satisfying the patient in the quickest way by giving a prescription. I believe it will be difficult now for New Zealand to extricate herself from the poor system on which the general practitioners have grown fat.

The New Zealand experiment teaches lessons. First, the medical care program was thrust on the country by the Labor Government without adequate consultation with medical groups. A chief reason for this was that organized medicine there was not conciliatory to change in medical care, like the British Medical Association in the Lloyd George regime and organized medicine in this country now. Thus, the medical care program was poorly thought out and designed. Second, it was commenced before the organization for medical care the country over was able to cope with it; it sought solution by removal of economic barriers alone. Third, the rank and file of general practitioners profited, as is bound to be the case in any medical care system in which the medically indigent become medically solvent, as they will do in this country as soon as the medically indigent group ceases to exist as such. It is astonishing that practicing physicians in this country do not see that their incomes will be increased the moment the medically indigent group becomes a secure source of revenue. But before leaving the account of the New Zealand experience with the fee-for-service method of reimbursement, I ought to caution against the impression that the medical care program there has been a failure. Whatever its defect in administration, it has made general practitioner service available to all and must have given feelings of security difficult to evaluate to low income groups particularly by removing the specter of pauperizing illness. The total success or failure of a medical care program can be measured in just one way, its results on the happiness and health of the people.

It is obvious that a *sliding fee-for-service* method of payment—I refer to our present system in which the physician has the right to charge what he thinks he can get—would vitiate, and hence be unworkable in any prepayment scheme which undertakes to furnish complete coverage medical care. But a regulated fee-for-service system has been used in Sweden successfully. However, I personally doubt if even the *regulated fee-for-service* method can be used successfully in any large prepayment program *including all medical services* in the complex conditions of this country, because it is so easily abused and difficult to control.

that he would not miss a word from Mark Hanna. But, however that may have been, the legislators have now sensed what the people want, and that is the significance of President Roosevelt's inclusion in his "second Bill of Rights," "The right to adequate medical care and the opportunity to achieve and enjoy good health," and the Wagner-Murray-Dingell Bills, the first introduced in 1943, and the ancillary Pepper Bill, and the more recent Taft-Smith-Ball-Donnell Bill, represent attempts to realize this objective practically. To my mind, President Roosevelt's inclusion in his "second Bill of Rights," Jan. 11, 1944, of the idea that each citizen had a right to the best medical care quite apart from his financial position, is a landmark in the medical history of the country, for the concept is so just, altogether right, and feasible, fills so burning a need, and was given such prominence through iteration by the late President, that there can be no going back. Every plan for medical care since the enunciation of this principle has perforce been aimed, on the surface at least, toward that magnificent goal.

The general objectives in a Utopian medical care program are easy to see but difficult to reach. There must be an adequate number of splendidly educated physicians. An educational system must be set up to keep the physicians of the nation abreast of medical progress. New hospitals and centers of different sizes and functional scope must be dotted over the country according to community needs, and they must be serviced by groups of specialists and must be equipped with laboratories and all the latest machinery of medicine. The study of disease and its prevention must be fostered and extended constantly. Finally, the physicians themselves must be well paid, and their lives and work made attractive, in order to bring into the profession, which is entrusted with the health of the nation, the best talent possessed. These objectives or principles are at the basis of medical programs in the more socially-minded countries and the programs differ chiefly only in the degree of centralization and rigidity with which they are organized. I shall speak of these principles presently.

In this country, there are great obstacles in the way of realizing the objectives just mentioned. The physical parts of the program, that is, the construction of hospitals and centers, is the easiest part. It will not be difficult for the medical schools, if given facilities and if prodded a little, to turn out more and better educated physicians. The experience in England and in New Zealand has shown that it is not so hard to give the population-at-large general practitioner service. The great obstacle—and it is enormously great—is psychological and lies in making physicians and the people, accustomed over years of habit to do something one way, to do it another. It would probably not be so difficult to change the habits of society; the great difficulty is in changing the habits and points of view of the medical profession, that is, in uprooting and changing over a system of medical care which is the outgrowth of centuries.

Another difficulty of a very practical nature in effecting changes in medical care, is that in the profession of medicine itself there is no leadership. I shall come back to this subject later.

In the main, there are two divisions of thought in planning a system of medical care which will suffice to meet the health needs of everyone: one is

Third, medical education should be extensively reorganized and improved in two parallel ways. First, it should be integrated much more closely with public health, and the student should be taught to regard the prevention of disease to be as much his duty as the care of the sick. In the list of objectives which the Canadian Medical Association adopted for presentation to the Canadian Government, the first on the list is "The Promotion of Health and the Prevention of Disease." Preventive medicine, or the proper attitude toward it, cannot be taught by placing separate departments of preventive medicine in medical schools. Why not establish separate departments of therapeutics? Preventive medicine is an every-day, every-hour, every-minute part of clinical medicine, and must be taught by clinical teachers themselves in connection with their cases and daily work, and the teachers of clinical medicine must learn to reorient themselves and their duties to this philosophy. Then the teaching must be reorganized so as to give to the student a broad social viewpoint, so that he can join in a concerted effort to furnish medical help in all aspects to all people, with intelligence and enthusiasm. Finally, practical training in hospitals or centers should be at least three years, making the total period of preparation seven years before risking a young doctor on the community.

Fourth, the private medical schools must have state aid. At Johns Hopkins the tuition is $600.00 a year. The cost to the medical school of the education of the student is $3,900 per year. With the shrinking resources and the disappearance of the old private supports and without the addition of new, the full-time medical schools cannot continue.

Fifth, the State must aid the student financially because of the long, costly preliminary years of preparation, if medicine is to attract the finest of our young men. During four years in Johns Hopkins Medical School, the cost of the expenses of the medical student, apart from tuition, is from $1,300 to $1,500 a year. During his hospital training as intern, he receives no stipend. Only to those who command financial resources and can wait the years of preparation is a medical career open. If the State salaried the young doctor during his three that was over it would be fair for the State to draft him on a salary basis for two years of hospital experience, a great part of the load would be lifted and after to three years for some rural community where physicians were required. This idea is suggested in the proposals of the Canadian Medical Association to the Canadian Government. A somewhat similar plan has been introduced into the medical care scheme of North Carolina. The plan would be similar to that now in operation in our naval and military academies.

Sixth, I now come to an idea of the greatest importance, namely, that the medical schools must agree to extend their teaching obligations to the practicing physicians. One of the worst features in our present system of medical care is that practicing physicians of the community have no adequate means of keeping up with medical progress and, in consequence, are left in intellectual, quickly turning to spiritual, stagnation. Of course, many, of the more progressive practicing physicians go to medical schools for refresher courses yearly or attend medical meetings where practical surveys of various topics in medicine are given by experts. But the education of practicing physicians ought to be organized so

out of the unworkable and the survival of the workable. Evolution in this sense goes on all the time no matter what we do and determines or undoes. in the end. the work of mice and men. But it is a very slow, merciless. wasteful process, and now there is no time to delay. for the public will take matters in their own hands through the agency of the government as they have done in England and New Zealand. Witness California at the moment!

But there are excellent reasons for going slowly. if we can only use them. Would it not be foolish to pass such a bill as the Wagner-Murray-Dingell Bill without waiting to see how the National Health Service Bill works out in Great Britain in the first year or two? We have before us the examples of Canada and New Zealand, the former setting a splendid precedent and the latter showing something to avoid. Then there are the Swedish and Russian systems. which I should like to discuss now.

The Swedish system of medicine is a combination of State and private practice systems. There is a voluntary insurance system. which. by 1944. had spread to 42 per cent of the population. but a large number of those who were poorest financially were still not members. Because the voluntary system has not reached the lowest income groups, and because it has been so successful in the case of the others. the government is about to make the insurance system compulsory. The medical students are of the elite of the preparatory schools and the general medical education equal to that anywhere in the United States. Hospitals and centers are distributed so as to be available to all. as are complete medical services. including those of the specialists. I now quote from a letter from Professor A. Lichtenstein (J. PEDIAT. 28: 503. 1946):

"As can be seen from this account, we have in Sweden a combined system of State and private medical care. The State and the municipality. partly with the help of the sick relief funds. ensure that every sick person. irrespective of his financial situation, has the opportunity of obtaining the best possible medical care either in the hospital or outside. To this end. the best specialists in the country in various fields are available as salaried medical officers at hospitals and as doctors for outpatients. The patient has. to a great extent a free choice of physician. *In my opinion, the free choice of a physician is necessary, for the patient, and for the physician, even in the case of members of sick relief funds, which embrace the largest proportion of the country's population.* The medical profession in Sweden is free. so that the individual doctor can. within a wide boundary. of his own free will choose the place and type of his activities. Even doctors appointed by the State or the municipalities are entitled. in so far as their work at the hospital permits. to carry on their profession with complete freedom.

"This system has. in my experience. functioned well. and on the whole fulfills the wishes of both the patient and the doctor. It is my opinion that a substantial state subsidy and control is necessary if the health and care of the sick in a country are to function effectively and satisfactorily. The fears expressed by some doctors, that a state activity as regards medical care would hamper or prevent the practicing doctor's exercise of his profession, have proved themselves to be unjustified. On the contrary, the work, for example, of the

demand for physicians; yet, as pointed out, physicians, and specialists in particular, are seven-year products at least, and yet no steps have even been contemplated to increase the output of the medical schools. Granted that it is impossible now to think through the problem of medical care to the very end, it is certainly possible to think a considerable way into it; some requirements are common to any comprehensive medical care plan, and are as evident now as twenty years away. There is no planning in what is going on, and this is because there is no medical leadership. The movements such as voluntary insurance and the isolated experiments in medical care were born in the minds of enterprising, socially conscious groups of physicians or lay organizations working outside organized medicine. If organized medicine had been responsible for these isolated attempts, even if unable to formulate any complete program of its own, it would have much to its credit. It, nevertheless, should have furnished the leadership, but not only has it not shown leadership, but has opposed important developments which have gone on. In spite of its dead weight, and resisting on occasions, organized medicine has been dragged forward by the sheer power of outside opinion and the force of example elsewhere, a long way since 1938, when it tried to block the formation of the Washington Group Health Association, until now it endorses the nonprofit prepayment or voluntary insurance principle, and recognizes the necessity under certain conditions of Federal Aid in medical care plans. But its much touted "Ten-point program" is no program in any original, dynamic, or constructive sense, or, indeed in any sense, but only a series of pious platitudes or highly qualified endorsements of policies or activities, initiated in the first instance by isolated groups of liberal minded, socially conscious physicians or laymen working independently of it. Its primary concern throughout as judged by its behavior has seemed to me to be aimed consistently at the preservation of the medical care system as it exists today at all costs. Disturbed, it cries out in the words of Fafnir coiled around his treasure, when the youthful Siegfried, the personification of the new order, approaches with his magic sword, "Lass mich schlaffen."

In this critical period of change, when the handwriting appears on so many walls, the behavior of organized medicine is humiliating, and its leadership has seemed incredibly stupid in contrast to the up-and-coming, progressive attitude of the Canadian Medical Association, which has boldly and unqualifiedly taken the leadership and presented to the Canadian government their own plan for a system designed to provide comprehensive medical care for everyone. When I asked a prominent Canadian physician how it happened that the Canadian Medical Association was so open- and liberal-minded, he replied, "We saw what was coming and decided it would be better to develop our own program, one which we liked, rather than to have one forced on us. He remarked further, "We have some big leaders." I think that Dr. Fishbein has had an opportunity, such as comes to few, to lead organized medicine in our country in a program of medical care which would have been a monument to an enlightened and progressive spirit, but he chose the opposite course, the course popular and easy at the moment but not the one destined to appear creditable in history. Without leadership, it is impossible to concert a plan, but I express the view that fresh

If we accuse Russia of imposing an iron curtain, we cover our eyes when we look toward Russia with the blinding veil of prejudice. I suspect there is much to be learned from the medical care system of Russia, and it is stupid to assume that it offers nothing to us, just because we do not like the cut of Russia's ideology. We must beware that in twenty years' time we are not outdistanced by that young, new-thinking nation, in terms of what a medical system does for the health and security of the people. Dr. Mudd's report, in *Science* (*Science* **105**: 269, 306, 1947) reveals the biological laboratories of Russia teeming with activities and ideas.

Then we have our own experiments in medical care—those in progress in Maryland, North Carolina, Washington, D. C, and New York City, as well as many others scattered over all parts of the country, some started by physicians and some by lay groups The hope and probability is that one or two of these experiments will emerge as unusually successful and serve as models. Unfortunately, I have not time to discuss these, but their spontaneous birth in so many places in so short a time is a portentous, healthful, promising sign.

A most important step, and by general agreement, one wholly in the right direction, is the Hospital Survey and Construction Act (the Hill-Burton Act), which is intended to furnish the physical setup for the extension of medical care to the areas of the country where most required Its general features are excellent. The State survey is essential. The provision that the State can make its own plans, based on its survey, is admirable, and the limitation of the Federal role essentially to standards and guidance is as it should be Under it, the states have the desirable autonomy, and yet the federal government has enough power to make certain of a carefully integrated and coordinate state and national plan. In brief, the balance between state control and federal control seems just and right. Then, also, it is a happy arrangement that the United States Public Health Service has the administrative assignment, for that splendid agency possesses uniquely the knowledge, organization, and high ethical standards required for this particular purpose. I know from experience that the United States Public Health Service can be of the greatest help in furnishing hospital plans Finally, the establishment of the hospitals and centers is an absolute requirement if the very latest developments in medicine are to be made available to all the people in the country.

But the Hill-Burton Act has some rather glaring deficiencies. It has no provision for federal funds to aid in the maintenance of the hospitals, once they are constructed, and it has the same matching requirement for the poor and the rich states This last means that the areas of the greatest need, the more rural states and communities, and those with less wealth which should profit the most are in actuality, discriminated against. While the federal funds are allotted to the states in such manner that the poorer states may receive larger proportions of the amounts available, the result of requirement for uniform matching is that the poorer states are less able to take advantage of the federal offers Thus, no real equalization has occurred

Bill S 545, introduced by Senators Taft, Smith, Ball, and Donnell, I shall refer to as the Taft Bill. It is at the opposite extreme from the Wagner-Murray-

THE ADEQUACY OF ARTIFICIAL FEEDING IN INFANCY

STUART SHELTON STEVENSON, M.D.*
BOSTON, MASS.

If health and strength permit thee, don't refuse
The child thy nipple; nor another's use—
Yet if thou'rt sickly, if thy spirits fail,
If the child's touch'd with any catching ail,
This duty, whether hated or desir'd,
Ceases, and 'tis no more of thee requir'd.
Then not to suckle, is not to neglect,
But chuse a nurse, and I'll thy choice direct.

Scevola de Sainte-Marthé (1526-1623)[1]

THE natural and preferred way to feed the human infant is at his mother's breast if this is feasible and practical. After a period of relative neglect of the breast feeding of babies, the pendulum has now swung so far in occasional clinics that the more ardent advocates of human milk would seem to have lost some objectivity in their arguments. Scevola's advice, which is quoted above, may be worth heeding: today we do not have wet-nurses available in practical supply, but it is obvious that many thousands of infants are being reared successfully on cow's milk mixtures. It seems pertinent to review the objections to cow's milk as an infant food and to look impassionately into the facts concerning the adequacy of artificial feeding in infancy.

OBJECTIONS TO COW'S MILK AS AN INFANT FOOD

A. The Protein in Cow's Milk Is Inadequate: It Consists Mostly of Casein and Casein Is Low in Cystine, an Essential Amino acid.—The large amount of total protein in cow's milk and the appreciable amount of lactalbumin which it contains help to make up for the deficiency of cystine. Recent work[2] suggests that casein is utilized as well as lactalbumin by human beings.

For many years, Powers (unpublished data) has fed premature infants successfully on cow's milk mixtures and growth has been satisfactory. Gordon and his associates[3] have confirmed this and shown, further, that premature infants who are fed upon cow's milk mixtures gain weight faster than when they are fed isocaloric amounts of human milk.

Infants who are fed upon cow's milk continue to increase the percentage of the nitrogen content of their bodies at a rate approximating the fetal increase. If they are fed upon human milk, containing less than half as much protein, the percentage of the nitrogen content of their bodies remains at the birth level or decreases slightly over a period of many weeks.[4] It would seem that the protein of cow's milk is adequate.

From the Department of Maternal and Child Health, Harvard School of Public Health.
*Assistant Professor of Child Health, Harvard University.

develop their own systems within the Federal structure. The plan for compulsory health insurance which the Canadian Medical Association has recommended to the Canadian government is in marked contrast to the Taft Bill in the wisdom with which the Federal-Provincial relationship is arranged. Their recommendation (The Medical Profession and Health Insurance: a Submission to the Special Committee on Social Security of the House of Commons by the Canadian Medical Association, 1943, J. PEDIAT. 31: 228, 1947) reads: "If Provincial autonomy is to be maintained as suggested above, it is extremely important that a sufficient degree of federal control be retained. This control should be limited to such matters as the extent and the standards of the services, as indicated previously. It is important, however, that control be maintained as it is only through this means that a satisfactory degree of uniformity can be obtained. Unless there is considerable similarity in methods and program in matters of disease prevention and control, the results from the national viewpoint will be jeopardized. . . .

"On this basis it is recommended that the federal administration be under the Minister of National Health, with an Advisory Dominion Council on Health Insurance.

". . . in the provinces it is strongly recommended that the plan come under a *non-political independent commission* which might be responsible to the legislature through the Provincial Minister of Health. . . ."

Among the details left to the Provinces might be "the income level . . . below which the residents would be included under an obligatory plan; the rate and method of payment for all services, professional and institutional; the best means of obtaining full preventive and public health services within the Province concerned; and the particular means which might be necessary to safeguard the basic necessity of maintaining adequate teaching services in connection with Medical Faculties and Teaching Hospitals within the Province."

The Taft Bill contains a suggestion that voluntary insurance be extended to the medically indigent through the use of tax money to pay the cost of coverage in voluntary prepayment plans. This raises the topic of insurance under public auspices, supplemented, as necessary, from general tax revenues. This is probably the best method for financing complete coverage for medical care for the entire population of the nation. Its merits, as an immediate measure, will be discussed by Dr. Ernst Boas in the April number of the JOURNAL OF PEDIATRICS (30: 478, 1947). As just stated, the Canadian Medical Association recommended, in 1943, to the Canadian Government, a compulsory health insurance system which could be made to include everybody or only those in certain income levels, according to the determination of each province. I do not believe that we in this country are yet prepared for universal health insurance, either psychologically or materially. The enactment of universal health insurance without an intervening period of planning, would throw the full weight of providing necessary care for the entire nation upon our present limited resources before they have been built up to the required strength. If, however, a Federal-State health insurance scheme, supplemented from general taxes when necessary, were made available to the low and middle income groups, the burden

of mind when she satisfies her human desire to know how much milk her baby has ingested. Parenthetically, it might be noted that many modern women do not seem to satisfy any maternal urge by suckling their young.

H. Artificially-fed Infants as a Group Suffer from a Higher Morbidity and Mortality Rate.—We have already stated that we consider breast feeding the natural and preferred way to feed a human infant. Obviously the most unintelligent mother can usually manage to offer her breast to her infant without mishap. But the errors of an unintelligent mother should not militate against the artificial feeding of an infant by a capable mother when this seems the necessary or more practical method.

It is true that artificially-fed infants suffer from a higher morbidity and mortality rate. This would seem to constitute the most important, valid objection to the artificial feeding of infants, and it is worth while to review this matter in some detail.

MORBIDITY AND MORTALITY IN THE ARTIFICIALLY-FED INFANT

A. In the Papers of Grulee and His Associates[7, 8] Which Have Become Classic Arguments for Breast Feeding, Certain Facts Are Apparent.—

1. Twenty thousand Chicago infants were studied between 1924 and 1929. That they received good medical and nursing supervision in infant welfare conferences becomes evident in the fact that their over-all mortality was four times as low as the infant mortality then prevailing in Chicago. The series was adequate in numbers and the artificial feeding was presumably carried out in a better than average manner.

2. Breast-fed infants showed a mortality of only 1.54 per thousand while artificially-fed infants suffered a mortality of 84.36 per thousand. This is a ratio of 1 to 56.

3. Ten per cent of all the deaths were attributed to gastrointestinal disturbances, 30 per cent to miscellaneous causes and 60 per cent to respiratory infections. It is reasonable to assume that a certain percentage of the gastrointestinal deaths were the result of parenteral diarrhea caused by respiratory infection. The respiratory mortality ratio of the breast-fed infants to that of the artificially-fed babies was 1 to 115, whereas similar ratios for gastrointestinal disease and miscellaneous causes were only 1 to 40 and 1 to 27 respectively. Thus the majority of the deaths among artificially-fed infants was due to respiratory infections.

4. The mortality rate from respiratory infections did not differ greatly in the breast- and artificially-fed infants until after the fifth month of life. Then the mortality from this cause in the artificially-fed group soared and accounted for much of the increased mortality of this group.

5. This work was done in the years 1924-1929. While the feeding mixture used was essentially comparable to those employed today, the vitamin complementation of the diet was inadequate by current concepts. Thus, the infants began to receive orange juice at 4 weeks of age; a daily amount of ½ teaspoon was increased slowly to 8 teaspoons by the age of 5 months. They began to

not democratic, for it creates economic and social distinctions. High-priced physicians in the main have rich patients and low-priced physicians the poor, and the low-priced physicians in consequence are the ones who carry the great burden of charity and are not so well equipped to do first quality work in consequence of heavier load and poorer facilities. Moreover, the method of payment stimulates avariciousness and breeds fee splitting. In short, it is the chief cause of criticism or of actual charges against the medical profession. Finally, as previously pointed out, it gives a wholly wrong distribution of medical care. When it is introduced into a prepaid complete coverage medical care plan or one based on direct payment by the State for service rendered, it is difficult to control and is likely to wreck the system. The New Zealand experiment in medical care illustrates the difficulties caused by the fee-for-service variety of payment.

The New Zealand plan, in brief, is that the government provides medical care for everyone by paying for medical and pharmaceutical benefits according to fixed rates. The fee-for-service or "direct claim" system was intended by the government to be the standard and has been the one chiefly used, though capitation and salary reimbursement have been employed to some extent. Under the fee-for-service system, the patient signs a form stating that service has been rendered and the physician sends in the form to the health department and receives 7s, 6d per service. This is the ordinary arrangement, but many physicians have used a so-called "Refund System" or "Token System," which makes the patient add 3s from his own pocket, so that the physician nets 10s, 6d per service. I shall not discuss the arrangements for specialist or laboratory services, but with this brief explanation will quote from Dr. Douglas Robb's book just published (*Health Reform in New Zealand.* Whitcomb and Tombs, Limited, 1947): "Under these schemes, the doctors have become extraordinarily prosperous. It is comparatively easy to work up a good income almost anywhere except, perhaps, in rural districts where a lot of travelling is still necessary. Actual figures of doctors' incomes are not published, but some which are almost fantastic are commonly mentioned in parliament. The highest rewards are obtainable under a company arrangement, where the principal can pay handsome salaries to juniors and still reap rich rewards. The individual man can make a big income by dint of hard work and organization. . . . From the doctor's point of view perhaps it is a good thing that by ordinary work he can secure very adequate rewards. . . . The emphasis is placed on the number of acts done rather than on quality. Indeed, we find the doctor personally doing a number of trifling things in his practice that ought to be done by a nurse or secretary, but are not so done because it is worth 7s 6d a time to the doctor, if he does them. . . . The poor man's cough is now as profitable as the rich man's, and certain areas both urban and rural formerly poorly served now have medical men on the spot. So far so good, but a further effect is to concentrate medical men in the cities as against country districts where travelling is greater. . . . Moreover, as between general practice and specialists, scientific and teaching work, there is a disproportionate attraction to the former. The pathologists, radiologists, hygienists, and teachers in the profession are almost

The gastrointestinal infections, for the most part, were diarrheas with no obvious parenteral cause; many of them may have been gastrointestinal upsets without infection as a basis. The great majority of the other infections were of the skin, such as impetigo and furuncles.

5. The dietary intake during pregnancy of ascorbic acid and vitamin A of the mothers of these infants was carefully ascertained as described in detail in the publication referred to previously.[10] There is no correlation between either the amount of ascorbic acid or Vitamin A taken prenatally by the mother and the number of infections in her infant. This is not an unexpected finding with respect to ascorbic acid when it is recalled[11-13] that the cord blood of the newborn infant is two to four times richer in ascorbic acid than the mother's blood at the same time. The differential is greater when the maternal plasma level of ascorbic acid is lower and the fetus seems to act as a parasite to a degree upon its mother with respect to this vitamin. The mother's prenatal intake of vitamin A would not be expected to affect the infant, within limits, when it is recalled[14, 15] that gross saturation of the mother with vitamin A (up to 400 I. U. per 100 c.c. of plasma) does not affect the level of vitamin A in the cord blood. Furthermore, Dann[16] has shown that the small amount of vitamin A in the liver of the newborn rat cannot be increased by feeding the mother rat large amounts of the vitamin during pregnancy.

6. Table I shows the percentages of breast- and totally artificially-fed infants in the series (150 infants tabulated here) who suffered with one or more infections of the three types, during the first year of life.

TABLE I. PERCENTAGES OF BREAST- AND ARTIFICIALLY-FED INFANTS SUFFERING FROM ONE OR MORE OF THE DIFFERENT TYPES OF INFECTIONS

TYPE OF INFECTION	PERCENTAGES OF INFANTS INFECTED
Respiratory	85.3
Gastrointestinal	27.0
Other	21.4

It is evident from Table I that respiratory infections, affecting 85.3 per cent of the infants, are the major cause of illness in all infants under one year of age regardless of the method of feeding.

7. Table II shows the average number of infections per infant, of each type, tabulated according to the method of feeding.

The increased amount of diarrhea in the partially breast-fed group would seem to have resulted from the fact that these infants as a group represented the more difficult babies and/or mothers. When their records are studied, it becomes evident that attempts were made to have the mothers continue breast feeding at a time when there did not seem to be sufficient milk or the infant

TABLE II. AVERAGE NUMBER OF INFECTIONS PER INFANT ACCORDING TO METHOD OF FEEDING

TYPE OF INFECTION	BREAST-FED	PARTIALLY BREAST-FED	ARTIFICIALLY FED
Respiratory	1.56	1.71	2.18
Gastrointestinal	0.10	0.23	0.12
Other	0.13	0.13	0.13

I shall not discuss other systems of payment to physicians in nationwide health plans except to say that in New Zealand and in England, physicians on the capitation method of payment have liked it, and capitation has many advantages, particularly in promoting preventive medical care. It is planned to try it in Baltimore for the care of the indigent as part of a plan, already endorsed by the Baltimore Medical Society, which is highly original and has great potentiality. Probably in any nationwide medical care system all three methods of remuneration, controlled fee-for-service, capitation, and salary have their places.

Now comes a subject which seems to me to be of great importance, namely, the participation of the medical schools in medical care plans, but there is time only to touch on it here and there.

First, there must be more physicians to cope with the increased burden of medical care under any plan which includes full care of all the people. Dr. Parran has supplied some figures in this regard. The medical schools of the country now turn out about 5,200 graduates a year. Adding the 7,000 graduates accrued as the result of accelerated war education, there would be produced, in the next twenty years (by 1957), 111,000 physicians. During the same twenty-year period, 77,000 would be lost from death or retirement. This gives an estimated net gain, by 1967, of 34,000 physicians. But the gain in population by 1967 will require 27,000 additional physicians to maintain the existing ratio of physicians to population. This reduces the net gain in 1967 of 34,000 physicians to 7,000. But a whole variety of unrelated factors, such as specialization and the increased complexity of medicine, the spread of prepayment plans of medical care, the inclusion of the medically indigent, the supply of the newly created health centers and hospitals, all unite to increase the requirement for physicians above the present physician-population ratio. To meet this, Dr. Parran calculates that by 1967 our medical schools must produce nearly 50 per cent more graduates than at the present time, 7,800 instead of 5,200. It follows that either the capacity of our medical schools must be increased or else new ones must be created. There would be great opposition at the Johns Hopkins Medical School to any large increase in the number of medical students because of a lack of expandable teaching facilities, and this attitude probably prevails in the other full-time medical schools. I personally hope very much that the increased demand for physicians will be met by the formation of new full-time medical schools which could then be placed in the areas of need just like the new hospitals and medical centers to be constructed under the Hill-Burton Act. But, though new hospitals and centers can spring up in two years, from seven to ten years at the least would be required to furnish the 50 per cent additional quota of physicians, and this means that to attain Dr. Parran's 50 per cent increase in the number of physicians by 1967, it will be necessary for the medical schools to plan on turning out 100 per cent more graduates immediately, that is, to double their admissions at once.

Second, our medical students should be better selected. The health of our people is so important that physicians should be as fine and intelligent a class as we possess. The standards in medical education ought to be high and the inducements to a medical career made great.

categories during the first six months of life. However, there is a statistically significant difference in the numbers for the second six months of life (0.95 for breast-fed, 1.43 for artificially-fed). This is reminiscent of Grulee's findings.[8] It is evident from Table IV that the artificially-fed infant in his second half year of life does not have the resistance to respiratory infection which the breast-fed infant enjoys, even though the breast-fed infant may have been weaned at the age of 3 or 4 months.

D. Comparison of Data.—In the comparison of morbidity and mortality rates in breast- and artificially-fed infants it is well to remember that breast-fed infants probably represent a series which tends to be selected for its more solicitous mothers. Grulee's study and the one which is reported here would seem to minimize this complicating factor.

The data from three clinics which are presented above are not strictly comparable: Those of Grulee concern only mortality;; those of Ebbs concern only hospitalized infants with varied fates; data presented here are from a much smaller series.. However, certain facts may be summarized:

1. The great majority of illnesses in infancy are respiratory, regardless of the method of feeding.

2. The increased incidence of respiratory infection in the artificially-fed infant occurs during the second half year of life.

3. The artificially-fed infants of Grulee's series, with their greatly increased mortality, were given vitamin complements which are inadequate when judged by current standards.

4. In the series of infants presented here who were given complements of vitamins currently considered to be adequate, there is no significant increase in the incidence of gastrointestinal and other infections in the artificially-fed group. The increase in respiratory infections in this group is relatively small and occurs during the second half year of life.

5. In the series of infants presented here, there is an increase in the incidence of diarrhea among the partially breast-fed infants which may be related to attempts at forcing an unwilling mother into continued breast feeding.

6. There is no correlation between the mother's intake of ascorbic acid and vitamin A during pregnancy and the amount of infection in her infant.

7. Valid objection to the artificial feeding of infants would seem to be based upon an increased amount of respiratory infection in the second half year of life.

THE MODIFICATION OF PRESENT-DAY ARTIFICIAL FEEDING

It has been shown that artificially-fed infants do not suffer from more diarrhea than do nurslings when the feeding is carried out with proper technique. But it has not been possible to effect a decrease in the incidence of respiratory infections in these babies which would seem commensurate with the increased precautions against infection. Data have suggested (Table III) that exposure to respiratory infection is not greatly different in the breast- and artificially-fed infant. This implies that host resistance, rather than exposure to the infective agent, as in the case of many diarrheas, is the factor which

as to be a regular part of their professional lives. Of course, medical schools could offer refresher courses, but by general admission this method is not the best way to teach. The method which has tremendous possibilities is for the medical schools to extend their activities into the subsidiary or satellite hospitals and centers created by the Hill-Burton Act. I do not know quite how the plan could be best worked out, but suggest that the Medical Schools send to the satellites on some rotation plan, groups of their able, splendidly trained specialists in internal medicine, pediatrics, surgery, x-ray, pathology, biological chemistry, etc., with the understanding that these men act as heads of the general services in their respective fields, consultants, and teachers. These emissary representatives of the medical school faculties would be full-time workers on salaries and would not compete with local physicians. The salaries would have to be good ones, and furnished to the medical schools by the State, for the medical schools must be given complete freedom. I also suggest that medical schools supply the satellite hospitals and centers with interns, who would work under their emissary preceptors from the medical school just as at the home hospitals. By general agreement, the finest medical care anywhere in this country is that furnished by the medical school hospitals, and the suggestion made would give the remote communities that same splendid level of care. The teachers assigned to the satellites could give clinics and systematic instruction of various kinds to the practicing physicians, and, much more important, could go over their patient problems with them in the home, out-patient clinic, ward, operating room, or laboratory. There is no teaching so good for teacher or student as case teaching. This extension of the medical schools to include the education of the practicing physicians would have the greatest influence I can conceive of in raising the morale, the standards of work and the enlightenment of the medical profession of the nation. I make one further suggestion, that if the private medical schools will not or cannot enter into this plan, the State subsidize the State-supported medical schools and create, where needed, new full-time State schools of medicine whose particular duty it will be to organize and furnish instruction to the practicing physicians, which will keep them abreast of medical progress.

A participation of the medical schools in medical care is envisioned in the National Health Service Bill for England and Wales.

As intimated, the policy of gradual development of a medical care program has its perils, and the perils are that the moves forward will be in wrong directions or will lead into pits, like the thinly concealed ones in the Taft Bill, or remain isolated when they ought to be coordinated. Gradual development is the best policy, provided it is carefully thought out, but it is dangerous if not thought out at all. Take the Hill-Burton Act for example. This was designed to make available the latest advantages of group medicine to the needed areas. Where will the specialists who are to form the groups come from? They will not spring from a ground sown with dragon's teeth like the robot warriors in the fairy tale. They cannot be enticed to rural areas by the prospects of large fees. If the attraction must be good salaries, then a little planning could bring the wonderful, uplifting influence of the medical schools into the program. Again, the construction of the hospitals and the centers makes at once an increased

It seems noteworthy that human milk contains two and one-half times as much ascorbic acid as does raw cow's milk (5 vs. 2 mg. per 100 c.c.), and boiled cow's milk contains almost none. Even the daily 30 mg. of ascorbic acid which is recommended for the 6-month-old infant[19] does not approach in quantity the 48 mg. contained in a quart of human milk. It is further noteworthy that human milk contains about twice as much vitamin A as does cow's milk (65 vs. 33 μg per 100 c.c.), and an approximately equal amount of carotene (25 vs. 30 μg per 100 c.c.). One quart of cow's milk thus contains the equivalent of approximately 1,700 I. U. of vitamin A (if 0.25 μg of vitamin A and 0.6 μg of carotene are considered to be equivalent to one I. U. of vitamin A activity). Because this more than supplies the daily 1,500 I. U. recommended for the 6-month-old infant,[19] artificially-fed infants not infrequently receive no additional vitamin A in their dietary. But the breast-fed infant is receiving approximately 2 900 I. U. of this vitamin in each quart of human milk.

It is apparent that the breast-fed infant who ingests one quart of human milk, even without vitamin complementation to his dietary, receives considerably greater quantities of vitamin A and ascorbic acid than the artificially-fed infant who is fed by recommended standards and drinks a quart of cow's milk in the process. In practice, this differential is even greater when infants are fed isocaloric amounts of the two milks because carbohydrate is added to cow's milk in the usual artificial feeding mixture and the amount of these vitamins in 100 calories of mixture fed is less than in 100 calories of cow's milk. If one might argue teleologically, nature is not usually extravagant and the relative abundance of these two vitamins in human milk seems noteworthy.

It is also important that the breast-fed infant seems to utilize ingested ascorbic acid better than the artificially-fed infant. Snelling[20] reported that a group of thirty-one breast-fed infants, with an average daily ascorbic acid intake of 35 mg. obtained from breast milk, showed plasma ascorbic acid levels averaging 0.76 mg. per 100 c.c. This value could not be raised even when these breast-fed babies were given orange juice as a complement to their mother's milk. On the other hand, a group of seventy-nine artificially-fed infants, with an average daily ascorbic acid intake of 30 mg. obtained from two or more ounces of orange juice, showed plasma ascorbic acid levels averaging only 0.30 mg. per 100 c.c. Breast milk may enhance the absorption of this vitamin, or the ingestion of it in breast milk at frequent intervals throughout the day may allow of more complete absorption. Dann[21] has shown, furthermore, that infants ingesting boiled breast milk show significantly higher plasma ascorbic acid levels after receiving a complement of the vitamin than do infants ingesting boiled cow's milk who received an equal amount of the vitamin. She repeats the suggestion of Levine and his colleagues. [22] that the greater amount of protein in cow's milk increases the infant's need for ascorbic acid.

A report by Daniels[23] suggests that the breast-fed infant absorbs ingested vitamin A more completely than does the artificially-fed infant.

The breast-fed infant not only receives greater quantities of ascorbic acid and vitamin A than the artificially-fed infant, but he seems to absorb them more completely or, in the case of ascorbic acid, perhaps has less need of this vitamin.

legislation should be introduced into Congress along a middle ground between the proposals of the Wagner-Murray-Dingell Bill on the one side and the Taft Bill on the other, legislation which, among other things, would give the Federal government enough authority to develop and maintain the general structure and standards of a comprehensive medical care system, but would allow the individual states freedom to develop their own programs within the general outline; which would preserve private practice, as it now exists, for the upper income groups, but would make medical care available through a *government* insurance scheme to the lower income groups, not merely general practitioner service but the most intelligent broad-reaching medical care which scientific progress and specialization through group practice have now made possible anywhere and which, finally, would augment and implement existing medical schools and establish new ones in needed areas, so that they could turn out annually the requisite number of excellent physicians and could assume regionally the continuous education of the practicing physicians as a regular part of their duties, preferably through extension into the newly created hospitals and centers.

A few weeks ago President Truman requested the Federal Bureau of Investigation to investigate all government employees in order to discover and eliminate Communists. I sometimes think that governments are more in need of psychiatrists than are individuals. The way to free this country from Communism is not by Gestapo espionage and persecution, methods which history has shown over and over and over again merely drive ideologies underground and give them increased impetus by repression and dispersion, but to make our own people so much better fed, housed, clothed, and educated and happier and freer than others, that Communism will wither and die for lack of soil of misery and discontent to grow on. I can think of no better beginning than with the least possible delay to reorganize medical care so that in full measure and in most modern kind it would be available to each citizen with all its benefits.

although it is possible to raise it almost to this level (93 I. U. per 100 c.c.) by 17,000 I. U. daily doses added to the diet.[31] These facts again suggest that the infant is either storing and/or utilizing vitamin A at a rapid rate.

May and his associates[32] showed that blood levels of vitamin A in infants, already low, decreased still further in the presence of fever and infection. They found there was a sharp drop in the blood level within a few days after placing an infant on an evaporated milk feeding mixture and suggested that "the amount of vitamin A customarily supplied to infants in ordinary whole cow's milk formulas may be scarcely sufficient to maintain an optimal level of vitamin A in the blood."

In 1923, Daniels[33] wrote: ". . . one is led to wonder whether the excessive reaction to infection which takes place in the artificially-fed baby is due to the fact that the protective substance (fat-soluble A) has been given in insufficient quantities or has not been absorbed from the alimentary tract in sufficient quantity."

It seems unnecessary to review here the extensive literature which deals with the relation of vitamin A deficiency to decreased resistance to respiratory infections. Attempts have been made to prove that the administration of vitamin A is without effect in increasing the infant's resistance to these infections but in many cases the infants studied were less than 6 months old, an age before the number of respiratory infections begins to increase, or they were receiving sufficient vitamin A in their basal diet to prevent deficiency. It seems probable that the newborn infant, with little reserve of vitamin A and an evident need for it, may suffer from a deficiency of it relatively quickly when the amount in his diet is inadequate and his absorption of it is poor. The artificially-fed infant receives less vitamin A than does the breast-fed infant and the probability of his suffering from a vitamin A deficiency cannot be overlooked.

The evidence suggests that vitamin A may be one of the substances contained in human milk which is stored in the breast-fed infant's body and enhances his resistance to respiratory infections. There is no reliable method for estimating the daily need of the artificially-fed infant for this vitamin, but it would seem reasonable to allow him a daily intake at least as large as he would obtain from breast milk. This would approximate 3,250 I. U. for a 6-month-old infant or 220 I. U. per pound of body weight and, as Clausen states,[34] ". . . if vitamin A has any anti-infective power, it should be administered in the earliest months when the growing organism may need large quantities, and when a deficiency is more likely to exist." There is no obvious reason why this administration should not be begun during the first week of life.

D. The "Recommended Dietary Allowance" of Ascorbic Acid in Infancy. —The recommended dietary allowance of ascorbic acid for the 6 to 8-month-old infant is 30 mg.[19] This figure was derived from various studies which show the lowest level of intake of the vitamin which will maintain "adequate" stores as judged by both the blood level of ascorbic acid and urinary excretion tests. The value thus derived represents "amounts well above the minimum needed to protect against scurvy, but below those needed for saturation." As in the

B. The Fat of Human Milk Is More Suitable for Human Ingestion.—This is apparently not true.[5] Furthermore, Gordon[7] has shown that premature infants gain more rapidly when the percentage of calories offered as fat is halved, presumably because of the inability of small infants to utilize any kind of fat adequately.

C. The Calcium of Human Milk Is Better Utilized by the Infant Because of a More Favorable Calcium-Phosphorus Ratio.—This is probably true. But cow's milk contains four times as much calcium as human milk and the percentage content of calcium in the infant's body increases steadily, after a small drop in the first few weeks, if he is fed cow's milk. By the end of his first year, he has a much higher relative calcium content than he had at birth. On the other hand, the infant fed human milk sustains a relative calcium content loss for many weeks and at the end of the first year of life the relative calcium content of his body is below what it was at birth.[4] There is no evident harm in the extra calcium storage which the infant achieves when he is fed cow's milk.

D. Cow's Milk Is Not Well Digested by the Infant.—It is now recognized that this indigestibility results from the large curds which casein forms when acted upon by rennin in the infant's stomach.[6] Present-day feeding mixtures offer denatured casein which forms soft, small, digestible curds.

E. Artificial Feeding Mixtures Are Difficult for the Mother to Make.—It would seem that this objection arose out of the complexities of the formulas of thirty years ago. The modern feeding mixture of milk, sugar, and water requires little mental dexterity for its preparation.

F. Artificial Feeding Is More Expensive.—This may be true when calculated only in terms of the money spent for the ingredients. When it is realized that the average woman ingests an inadequate diet and shows no present disposition to change her eating habits, then it must be admitted that lactation presents a serious drain on the mother which may be of incalculable expense to her future well-being. Furthermore, the modern mother must not infrequently work at a part-time job to complement the family income. Obviously she cannot work and be at home to nurse her infant.

G. Artificial Feeding Does Not Satisfy the Infant's Psychic Needs.—The infant evidently gains needed satisfaction from the exercise of his sucking reflex during feeding. A sufficiently small opening in the rubber nipple would seem to offer him pleasure as great as he would obtain from sucking at the breast.

It seems desirable that the infant should be fondled and loved during his feeding if he is to be properly conditioned toward food and perhaps toward life in general. This fondling, offered automatically by the mechanics of breast feeding, can be supplied to the artificially-fed infant if the mother is properly instructed.

If the infant gains such psychic satisfaction at the breast as we have been led by some to believe, it seems surprising that almost every infant, if he is being fed by both methods, prefers the bottle. Psychic satisfaction will not be achieved for the infant unless the milk supply is adequate. Artificial feeding offers the easier means of ascertaining this adequacy and gives the mother peace

It is not necessary to review here the vast literature dealing with the relation of ascorbic acid deficiency to decreased resistance to respiratory infection. It is suggested that this vitamin may also be one of the substances contained in human milk which enhances the breast-fed infant's resistance to respiratory infections.

Because ascorbic acid has such varied functions to perform in the infant's body, it is difficult to estimate the daily requirement by any single test. Selleg wrote,[37] "It seems evident that the normal requirement of vitamin C per day for an infant may be estimated from the amount supplied in mother's milk when the parent is receiving a good diet." Snelling's work[20] shows that 30 mg. per day were not sufficient to raise the ascorbic acid plasma level of the artificially-fed infant to that of the breast-fed baby; and Mindlin's work[36] shows that even 75 mg. of the vitamin per day were not sufficient to accomplish this. Bakwin[38] reported that it required 75 to 100 mg. of ascorbic acid daily to keep the blood level of the artificially-fed infant comparable to that of the breast-fed infant. It would seem reasonable to allow the artificially-fed infant at least 100 mg. of ascorbic acid per day, to administer this in divided doses in each feeding and to begin such administration as soon as the infant begins to take food by mouth.

SUMMARY

1. Breast feeding in infancy is natural and preferred when practical and feasible.

2. The great majority of all infection in infancy is respiratory.

3. The only valid objection to the proper artificial feeding of infants would seem to be the resulting higher incidence of respiratory infections during the second half year of life, amounting to 1.43 respiratory infections per artificially-fed infant and 0.95 respiratory infections per breast-fed infant.

4. It would seem that the breast-fed infant's greater resistance to respiratory infections arises from some substance or substances contained in human milk.

5. There is no significant difference in the amount of diarrhea and miscellaneous infections between babies breast- and properly artificially-fed.

6. The high incidence of diarrhea in partially breast-fed infants may result from attempts to have an unwilling mother breast feed her baby.

7. The vitamin A daily intake of the 6-month-old, breast-fed infant approximates 3,250 I. U. as compared with the daily 1,500 I. U. recommended by the Food and Nutrition Board of the National Research Council. There is evidence to suggest that the infant's need for this vitamin is great and some evidence which suggests that he absorbs it more completely when he is breast-fed.

8. The ascorbic acid daily intake of the 6-month-old breast-fed infant approximates 55 mg. as compared with the daily 30 mg. recommended by the Food and Nutrition Board of the National Research Council. There is considerable evidence that the infant's need for this vitamin is great and that he absorbs it more adequately or needs it less when he is breast-fed.

receive cod liver oil at 6 weeks of age: a daily dosage of 10 drops was increased gradually to 3 teaspoons by the age of 5 months.

B. From the Work of Ebbs and Mulligan,[9] Further Facts May Be Summarized.—

1. One thousand five hundred infants under one year of age admitted to the hospital with infections were studied.

2. Of these infected babies, 15.1 per cent had been breast fed, whereas 35.6 per cent of the babies in the city's well-baby clinics were being breast-fed. In other words, the incidence of breast feeding among the infants admitted for infection was less than half the incidence in the city well-baby clinics.

3. Respiratory infections accounted for 73.7 per cent of the hospital admissions, and gastrointestinal infections accounted for another 20.9 per cent. Thus respiratory infections accounted for a majority of the illnesses.

4. The mortality of breast- and artificially-fed infants was essentially the same: 18.5 per cent for the breast-fed infants and 16.4 per cent for the artificially-fed babies.

C. The Records for the First Year of Life of 263 Infants Have Been Analyzed by the Writer.—These infants were carefully followed in connection with a longitudinal study of child health and development which is still in progress in the Department of Maternal and Child Health of the Harvard School of Public Health. The methods adopted in this comprehensive study have been described in a former publication from this department.[10] The records being considered here were obtained during the years 1930 to 1940. Certain facts seem pertinent:

1. Ninety-five infants were breast fed for three months or longer; 113 infants were partially breast fed; fifty-five infants were entirely artificially fed. The series is selected, in that only those records which were complete for the first year of life were analyzed. This implies that these infants had mothers with the initiative and desire to cooperate which regular attendance at the study clinic required. The economic and social strata of the infants were varied. Growth and development of the entire group were, in general, satisfactory.

2. The cow's milk feeding mixtures which were used supplied about 55 calories per pound of infant body weight. One-third to one-fifth of the total calories was in the form of added carbohydrate.

3. Orange juice and plain cod liver oil were begun on all the infants before the second week of life and the amounts increased as rapidly as tolerated until 4 ounces of orange juice and 2 teaspoons of cod liver oil were being given daily. Thus it was planned that each baby would be receiving a daily complement of approximately 60 mg. of ascorbic acid, 6,300 I. U. of vitamin A, and 630 I. U. of vitamin D by the time he was a few weeks old.

4. The illnesses of each infant were tabulated as respiratory, gastrointestinal, and other infections. The respiratory infections were further tabulated as upper respiratory infections, without fever, of at least two days' duration; and as respiratory infections with fever. The latter category includes the complications of such infections as otitis media, cervical adenitis, and pneumonia.

8. Grulee, C. G., Sanford, H. N., and Schwarz, H.: Breast and Artificially Fed Infants, J. A. M. A. 104: 1986, 1935.
9. Ebbs, J. H., and Mulligan, F.: The Incidence and Mortality of Breast and Artificially Fed Infants Admitted to Hospital with Infections, Arch. Dis Child. 17: 217, 1942.
10. Stuart, H. C. and Staff: Studies from The Center for Research in Child Health and Development, School of Public Health, Harvard University. I. The Center, the Group Under Observation, Sources of Information, and Studies in Progress. Monographs of the Society for Research in Child Development IV: Serial 20, No. 1, 1939.
11. Teel, H. M., Burke, B S, and Draper, R: Vitamin C in Human Pregnancy and Lactation I Studies During Pregnancy, Am. J. Dis. Child. 56: 1004, 1938.
12 Mindlin, R. L: Variation in the Concentration of Ascorbic Acid in the Plasma of the Newborn Infant. J. PEDIAT 16: 275, 1940.
13. Braestrup, P. W.: Studies of Latent Scurvy in Infants II. Content of Ascorbic (cevitamic) Acid in the Blood Serum of Women in Labour and in Children at Birth, Acta Paediat 19: 328, 1937.
14. Byrn, J. N., and Eastman, N. J.: Vitamin A Levels in Maternal and Fetal Blood Plasma, Bull Johns Hopkins Hosp 73: 132, 1943.
15 Lewis, J. M, Bodansky, O., Lilienfeld, M C. C., and Schneider, H: Supplements of Vitamin A and of Carotene During Pregnancy, Am J. Dis Child. 73: 143, 1947.
16 Dann, W. J.: The Transmission of Vitamin A from Parents to Young in Mammals, Biochem J. 26: 1072, 1932
17. Sargent, F. II, Lombard, O. M., and Sargent, V. W.: Further Studies on Stability of Resistance to the Common Cold, Am. J. Hyg. 45: 29, 1947.
18. Lawrence, J. M, Herrington, B. L, and Maynard, L. A.: Human Milk Studies: XXVII, Comparative Values of Bovine and Human Milks in Infant Feeding, Am. J. Dis. Child 70: 197, 1945
19. Recommended Dietary Allowances, Food and Nutrition Board, National Research Council, revised 1945.
20. Snelling, C. E.: The Plasma Ascorbic Acid of Infants and Children, J. PEDIAT 15: 824, 1939.
21 Dann, M: The Influence of Diet on the Ascorbic Acid Requirement of Premature Infants, J. Clin. Investigation 21: 139, 1942
22 Levine, S. Z, Gordon, H. H, and Marples, E: A Defect in the Metabolism of Tyrosine and Phenylalanine in Premature Infants, J Clin Investigation 20: 209, 1941.
23. Daniels, A. L: Vitamin A Content of Fecal Excretion of a Breast Fed and Artificially Fed Infant, Preliminary Report, Proc Soc Exper Biol & Med 23: 824, 1926.
24 Bloch, C. E: Blindness and Other Diseases in Children Arising From Deficient Nutrition (Lack of Fat Soluble A Factor), Am J. Dis Child. 27: 139, 1924
25 Boynton, L C., and Bradford, W. L: Effect of Vitamins A and D on Resistance to Infection, J. Nutrition 4: 323, 1931.
26 Lewis, J. M, Bodansky, O. and Shapiro, L M.: Regulation of Level of Vitamin A in Blood of Newborn Infants, Am J Dis Child. 66: 503, 1943.
27. Ellison, J. B and Moore, T.: The Vitamin A Reserves of the Human Infant and Child in Health and Disease, J. Soc Chem Industry 55: 236, 1936.
28 Wolff, L K: On the Quantity of Vitamin A Present in the Human Liver, Lancet 2: 617, 1932.
29. Rowntree, J. I: A Study of the Absorption and Retention of Vitamin A in Young Children, J. Nutrition 3: 265, 1930.
30. Lesher, M, Brody, J. K, Williams, H. H, and Macy, I C: Human Milk Studies XXVI: Vitamin A and Carotenoid Contents of Colostrum and Mature Human Milk, Am. J Dis Child 70: 182, 1945.
31 Lewis, J. M, Bodansky, O, and Haig, C Level of Vitamin A in the Blood as an Index of Vitamin A Deficiency in Infants and Children, Am J Dis Child 62: 1129, 1941
32 May, C D, Blackfan, K. D, McCreary, J. F., Allen, F H. Jr: Clinical Studies of Vitamin A in Infants and Children, Am. J. Dis Child 59: 1167, 1940.
33. Daniels, A L, Armstrong, M. E, and Hutton, M K.: Nasal Sinusitis Produced by Diets Deficient in Fat soluble A Vitamin, J. A M. A. 81: 828, 1923
34 Clausen, S W.: The Effects of Moderate Deficiency of Vitamins, Bull New York Acad. Med. 10: 471, 1934.
35 Neuweiler, W.: Versuche uber den Vitamin C Stoffwechsel beim Fetus, Klin Wehnschr 14: 1040, 1935
36 Mindlin, R L: The Relation Between Plasma Ascorbic Acid Concentration and Diet in the Newton Infant, J. PEDIAT. 13: 309, 1938.
37. Selleg, L., and King, C. G: The Vitamin "C" Content of Human Milk and Its Variation With Diet, J Nutrition 11: 599, 1936
38. Bakwin, H.: Vitamin C Requirement of Infants, Report read before Acad of Pediat. Region I Meeting, New York, June 13, 1939.

was not thriving on breast milk or the mother thought he was not. Not infrequently these mothers complemented their breast milk with self-concocted feeding mixtures. It does not seem profitable to attempt further analysis of this partially breast-fed group.

There is a statistically significant difference between the average number of respiratory infections in the breast- (1.56) and the artificially-fed (2.18) infant. There is no significant difference between the two groups with respect to gastrointestinal and other infections. It is evident from Table II that respiratory infections constitute a special problem of the artificially-fed infant.

8. Table III shows the percentages of infants who suffered from respiratory infections. These are tabulated according to the method of feeding and the series is broken down to show percentages of upper respiratory infections of two days' or more duration without fever, and of respiratory infections with fever.

TABLE III. PERCENTAGES OF INFANTS SUFFERING FROM ONE OR MORE RESPIRATORY INFECTIONS

TYPE OF INFECTION	PERCENTAGE OF INFANTS INFECTED	
	BREAST-FED	ARTIFICIALLY-FED
Respiratory (all types)	80.0	94.5
URI without fever	56.9	60.0
Respiratory with fever	23.1	34.5

There is a statistically significant difference between the percentages of breast- (80 per cent) and artificially-fed (94.5 per cent) infants suffering from one or more respiratory infections of all types. The percentages of infants of both feeding categories who contracted one or more upper respiratory infections without fever (56.9 per cent and 60.0 per cent) are proximate. This suggests that the amount of exposure to respiratory infections was not greatly different in the two groups. The percentages of the two categories of infants who had one or more respiratory infection with fever (23.1 per cent and 34.5 per cent) are not significantly different, but there is a numerical advantage to the breast-fed infant. This suggests that the artificially-fed infant, with exposure equivalent to the breast-fed baby, does not have the same resistance as the latter and allows his upper respiratory infection to develop into a more serious disease. Furthermore, it is evident from Table II that the artificially-fed infant suffers from more repeated respiratory infections than his breast-fed colleague.

9. Table IV shows the average number of respiratory infections of all kinds per infant for each quarter of the first year of life. They are tabulated according to the method of feeding.

There is no significant difference between the number of respiratory infections per infant (0.61 for breast-fed; 0.75 for artificially-fed) in the two feeding

TABLE IV. AVERAGE NUMBER OF RESPIRATORY INFECTIONS PER INFANT PER THREE-MONTH PERIOD

METHOD OF FEEDING	NUMBER OF RESPIRATORY INFECTIONS PER INFANT			
	0-3 MO.	3-6 MO.	6-9 MO.	9-12 MO.
Breast	0.21	0.37	0.36	0.59
Artificial	0.29	0.46	0.65	0.78

the southeast of Guadalcanal were Espiritu Santo and Efate in the New Hebrides. To the northwest were Tulagi-Florida, the Russell Islands, the New Georgia Group, Vella La Vella, Treasure Island, Bougainville, Green Island, and Emiru Island, the latter two being in the Bismark Archipelago. This area is to be distinguished from the Southwest Pacific Area.

EARLY EPIDEMICS

The three factors which, in combination, resulted in the early and explosive epidemics of malaria were heavily infected natives, large numbers of anopheline mosquitoes, and susceptible troops. Each of these factors will be discussed briefly.

Table I shows malaria parasitemia rates among South Pacific natives. This table is a consolidated report of surveys on more than 11,000 natives, and shows an average parasitic index in the New Hebrides of 11 per cent and in the Solomons and the Bismark Archipelago of over 30 per cent.

TABLE I. MALARIA PARASITEMIA AMONG SOUTH PACIFIC NATIVES: CONSOLIDATED DATA FROM 71 SURVEYS

ISLAND GROUP	NO. SURVEYS	NO. EXAMINED	PARASITIC INDEX (%)	
			AVERAGE	RANGE
New Hebrides	18	8,000	11.5	5-57
Solomons	49	2,651	31.6	4-74
Bismarck Archipelago	4	663	32.0	12-48

Table II shows the relation of age to incidence of malaria parasitemia. Children under 5 years of age averaged over 91 per cent positive smears. Children from 6 to 15 years of age averaged about 66 per cent positive smears and individuals over 15 years of age averaged 29 per cent positive smears. The percentage of natives with splenomegaly ranged from 57 to 85. These data merely indicate the extent and seriousness of the seed bed of malaria in the native population.

TABLE II. RELATION OF AGE TO INCIDENCE OF MALARIA PARASITEMIA AMONG SOUTH PACIFIC NATIVES*

AGE GROUP† (YR.)	NO. SURVEYED	% POSITIVE	PLASMODIUM SPECIES (%)			
			VIVAX	FALCIPARUM	MALARIA	MIXED AND UNDETERMINED
0-5	163	91	54	15	13	17
6-15	220	66	58	19	6	16
Over 15	448	29	35	26	6	32

*Natives from Guadalcanal, Savo, Green, and Russell Islands.
†Ages are approximate.

The second factor in the early epidemics was the local vector, *Anopheles (Myzomyia) farauti*, Laveran, which has few if any equals as an effective and dangerous transmitter of malaria. This moquito and other local anophelines offered a particularly difficult problem in control because they would breed in so many types of water. They would lay eggs in fresh water, in brackish water, in clean water, in dirty water, in sunshine, and in light shade. Most

determines clinical respiratory infection in the infant. It is worth noting that Sargent and his associates[17] have recently suggested that a constitutional factor is important in the etiology of the common cold in adults.

What is the basis for this greater resistance to respiratory infections which the breast-fed infant seems to possess during his second one-half year of life? Protection by the known passive antibodies which are transferred through the placenta lasts usually only through the first one-half year of life. Most infants are not breast-fed beyond 6 months of age, yet the increased respiratory resistance of the breast-fed infant becomes evident after the infant is weaned, and remains effective for many months. Long duration of protection is not a recognized virtue of passive antibodies of any variety. The mother's immunity to respiratory infections is short-lived and inadequate at best. It does not seem probable that such immunity could be supplied to the breast-fed infant in the form of passive antibodies either transplacentally or in the breast milk. Rather it seems likely that some substance or substances contained in breast milk are stored in the body of the breast-fed infant which are important to his resistance to respiratory infections long after breast feeding has been discontinued. A comparison of human and bovine milks may suggest what these substances are.

A. Comparison of Human and Bovine Milk.—Human and bovine milks show certain differences in composition. Their protein and calcium contents have been discussed above. It is accepted that the importance of their approximately equal deficiency of iron is minimized by the fact that the infant is born with a store of iron usually sufficient to the period of his milk diet.

Their differences in vitamin content are tabulated in Table V, which is modified from the paper of Lawrence and associates.[18]

TABLE V. VITAMIN CONTENT OF HUMAN AND COW'S MILK

VITAMIN CONTENT	HUMAN MILK (PER 100 C.C.)	COW'S MILK (PER 100 C.C.)
Thiamine (μg)	14	38
Riboflavin (μg)	37	200
Nicotinic acid (μg)	183	85
Vitamin D, U. S. P. units	0.4 to 10	0.5 to 4.0
Ascorbic acid, mg.	5	2
Vitamin A (μg)	65	33
Carotene (μg)	25	30

Raw cow's milk contains more than twice as much thiamine as does human milk (38 vs. 14 μg per 100 c.c.), and the usual loss of thiamine in the processing of cow's milk varies from a usual 10 per cent to a maximum 60 per cent.[18] This means that even boiled cow's milk remains a richer source of thiamine. Raw cow's milk contains about five times as much riboflavin as does human milk (200 vs. 37 μg per 100 c.c.) and the loss of this vitamin in processing is not excessive.[18] Human milk contains about twice as much nicotinic acid as does bovine milk (183 vs. 85 μg per 100 c.c.) but its significance for the infant is not clear. Both milks contain inadequate amounts of vitamin D and it is generally believed that all infants should receive additional vitamin D in their dietary.

Guadalcanal in the Solomon Islands, was occupied by amphibious assault on Aug. 7, 1942. Our troops who made the initial landings found few mosquitoes and had little malaria during the first weeks. No antimalaria work was done in this period. Meanwhile, anophelines were laying myriads of eggs in the fifty or more streams and lagoons and in the ruts and shell holes. Enormous mosquito populations were produced. A few cases of malaria appeared in August, more in September, and the disease became epidemic in October with a peak rate of 1,800 per thousand per annum in November. Epidemic rates continued for ten months.

It is difficult to realize the seriousness of the problem which was presented by these figures. One regimental surgeon on Guadalcanal reported that less than 50 per cent of his men were fit for active combat. In some outfits over 90 per cent of the men had malaria. Men had their chills and took their atabrine and quinine at their posts. Troops which were sent to rear areas for rest and rehabilitation suffered repeated malaria relapses and their return to combat was delayed for months beyond the expected date. The theater surgeon said that malaria was costing the theater the equivalent of two divisions in man power. It continued to exact this toll for more than a year.

The urgent military situation and the shortage of supplies were partially responsible for these early epidemics. It was necessary to occupy these islands months before the arrival of trained malaria control personnel over a year before adequate supplies were available, and at a time when atabrine was still an unfamiliar drug. The concept of "malaria discipline" had not yet been developed and the prevailing attitude was well expressed by one high ranking officer on Guadalcanal who said, "We are out to fight the Japs and to hell with the mosquitoes."

DEVELOPMENT OF MALARIA CONTROL ORGANIZATION

Graph II shows the basic organization which was developed to meet this situation. This basic malaria control group was responsible for insect control in an area of about twenty square miles and served 20,000 to 30,000 troops. The lower rectangle shows the labor part of this organization. The importance of one of these labor groups, the antimalarial details, should be emphasized. These details were formed in every company, and consisted of three enlisted men who were trained as will be described later and who were responsible for all insect control measures in the territory occupied by their company. Their chief work was to spray oil or a DDT mixture on all standing water in their camp area.

The technically trained group who were responsible to direct this work comprised the malariologist, the malaria survey unit, and malaria control unit. The survey unit consisted of an entomologist, and a parasitologist, and four to ten technicians. The entomologist and technicians provided information as to the kind of mosquitoes that were breeding, where they were breeding, and how they could be eliminated. The control unit comprised a sanitary engineer and eleven enlisted men, who directed the field control work which will be described

B. The "Recommended Dietary Allowance" of Vitamin A in Infancy.—The recommended dietary allowance of vitamin A for the 6- to 8-month-old infant is 1,500 I. U.[19] Because there is not yet any generally accepted method for determining the daily requirement for vitamin A, because the amount required varies according to the percentages in the diet represented by vitamin A and carotene, and because body storage of the vitamin complicates balance studies: "Greater divergence of judgment exists as to the requirement for vitamin A than for any other dietary essential."[19] Most estimates of the human requirement are based on studies of the amount needed to maintain normal dark adaptation of the eye. Dark adaptation is, for practical purposes, impossible to study accurately in the infant. The National Research Council was forced to take the maximum estimated adult requirement which seems to be related to body weight and assume that the infant's requirements per pound of body weight were higher than the adult's. To allow for this assumed increased infant requirement, the calculated requirements were arbitrarily multiplied by the factors which represent the infant's increased protein requirement per pound of body weight. Thus the figure of 1,500 I. U. was obtained. It should be noted that no reference whatever is made, in the calculation of this figure, to the amount of vitamin A that the nursling obtains. This approximates 3,250 I. U. daily for an average 6-month-old breast-fed infant, if it be assumed a 15-pound infant ingests 47 calories per pound per day.

C. The Infant's Need for Vitamin A.—The infant's need for vitamin A was emphasized in Bloch's classic paper[24] in which he noted that xerophthalmia was a characteristic of vitamin A deficiency in growing animals; that it occurred early in infants on a vitamin A deficient diet and appeared in older children only after an absolute lack of the vitamin for a long period of time. He stated that he had never seen a case of xerophthalmia in a breast-fed infant. He emphasized that vitamin A deficient infants were frequent victims of respiratory infections and otitis media. In this connection, Boynton's[25] statement is pertinent: "Increased susceptibility to infection is apparently an early manifestation of a dietary low in vitamin A, having marked influence before the physical signs of deficiency are present."

The blood level of vitamin A is low in the newborn infant and drops still lower on the third day of life.[26] This third day drop still occurs when the infant is given a large amount of vitamin A during his first two days of life, and suggests either that the newborn organism is storing the vitamin at a rapid rate in its tissues or that utilization of the vitamin is great in the infant. Rapid storage seems a not unlikely explanation when it is recalled that the amount of vitamin A in the newborn liver is very small or nil.[27, 28] and that there is no evident limit to the infant's capacity to store vitamin A.[29]

Colostrum contains three times the amount of vitamin A and ten times the amount of carotenoids found in mature human milk.[30] It seems reasonable to imply that this fulfills an increased need of the newborn infant for the vitamin.

The blood vitamin A level of the infant continues to be low through his first six months of life and averages 75 I. U. per 100 c.c. It does not reach the average level of older children (110 to 117 I. U. per 100 c.c.) until after one year.

TABLE III. MALARIA AND INSECT CONTROL PERSONNEL (MAY, 1944)

DESCRIPTION	NO.
Technically trained personnel (malariologists, malaria survey and control units)	771
Skilled labor (navy construction battalions and army engineers)	634
Unskilled labor (medical sanitary companies, troop antimalaria details, natives)	3,002
Total	4,407

following its establishment. There were over 700 technically trained personnel, over 600 skilled and 3,000 unskilled laborers working full time at insect control problems.

TRAINING AND EDUCATION PROGRAM

One of our major endeavors was a training and education program, which paid as great dividends per hour of effort as any other activity. This program was planned to reach every officer and man in the area on a level consistent with his responsibility.

An area training center for control of malaria and other insect-borne diseases was established and gave a two-week course for malariologists. An apprenticeship training program was developed for all newlyarrived malaria survey and control units and for malariologists. The apprenticed personnel worked in the field for several months with a veteran teaching group before undertaking independent responsibility. Schools were held for antimalarial details by every base malaria control group and gave a three-day course in field control methods which was attended by from 4,000 to 5,000 men over a two-year period.

A wide publicity and educational program to improve "malaria discipline" was undertaken. Posters, calendars, and comic strips featuring "Malaria Moe" and "Miss Anopheles" were prepared by our own artists, printed locally, and distributed widely. Pocket sized manuals were prepared on malaria and on a few other diseases and a copy given to every officer and man in the area.

SURVEY AND CONTROL MEASURES

No attempt will be made to describe survey and control measures in detail. A few activities will be described briefly and photographs will be used to illustrate some features of the work.

The parasitological section of the survey unit was responsible for all parasitological studies both on natives and on military personnel. Each large base had from several hundred to several thousand natives living within the troop area. Fig. 1 shows a blood smear survey of a native labor group on Guadalcanal. Note the typical open thatched type of construction. It would not have been feasible to screen these buildings even if screening had been available. The temporary solution was to give atabrine to these natives and to control rigidly all mosquito breeding near their village area. As soon as it was possible to build the necessary roads, all natives were moved to special camps which were located a mile away from the nearest troop quarters.

case of vitamin A, no reference is made to breast milk in calculating this recommendation of 30 mg., although the average breast-fed infant of 6 months, if it be assumed a 15-pound infant ingests 47 calories per pound per day, receives 54 mg. daily. And no definition of "adequate" stores is attempted.

Ascorbic acid presumably is stored in the infant's body, for it is common knowledge that it takes an infant several months to develop scurvy on a scorbutic diet and it seems no more reasonable to judge the amount of ascorbic acid in the infant's body by the blood level of the substance than it would be to judge the amount of glycogen in the body by the level of the blood sugar. It is not feasible here to review the literature which deals with the many functions of ascorbic acid in the body, but the prevention of scurvy in the infant would not seem to be sufficient proof of the adequacy of his ascorbic acid intake.

E. The Infant's Need for Ascorbic Acid.—The infant's need for ascorbic acid even at the time of birth becomes evident from the fact that his cord blood contains two to four times as much of the vitamin as his mother's blood at the time of delivery, [11-13] and that the blood of the umbilical vein contains twice as much ascorbic acid as the blood of the umbilical artery.[35]

Unlike fat-soluble vitamin A, ascorbic acid is evidently transferred across the placenta with ease. But the infant's need for ascorbic acid must be great or his storage of it poor for Mindlin[12] found plasma levels of the vitamin averaging 1.16 mg. per 100 c.c. within twenty-four hours after birth, 0.74 mg. per 100 c.c. at forty-eight hours, and 0.67 mg. per 100 c.c. at 72 hours of age. He suggests that the rapid formation of mesodermal tissues in the infant creates a great need for ascorbic acid with its important function in the formation of mesodermal intercellular substance.

Evidence has been quoted above[20, 21] which shows that ascorbic acid is better absorbed or less needed when it is ingested with breast milk. Mindlin[36] studied a group of 2-week-old infants and found an average plasma level of 1.0 mg. per 100 c.c. in the breast-fed group while the plasma level of the artificially-fed group averaged only 0.4 to 0.7 mg. per 100 c.c. even with 20 to 75 mg. of ascorbic acid added to their daily diet. The levels in the group fed artificially were obtained sixteen hours after oral administration of the vitamin, and it is suggested that ingestion of ascorbic acid at more frequent intervals, as with breast milk, is more desirable.

Levine and his associates,[22] after showing that premature infants could not properly metabolize tyrosine and phenylalanine without ascorbic acid, produced the same metabolic defect in full-term infants by feeding them these acids, and abolished it by adding ascorbic acid to this diet. As previously noted, they suggested that the need for ascorbic acid might be increased as the protein of the diet was increased. This may well be the explanation of the seeming increased need of artificially-fed infants for the vitamin

It is evident that the artificially-fed infant receives less ascorbic acid than his breast-fed colleague and that this ingestion is less effective either because of less efficient utilization of the vitamin or a greater need for it. The possibility of a deficiency of ascorbic acid in the artificially-fed infant is not unlikely.

Fig. 4 shows a spray crew applying a coating of DDT dissolved in kerosene to the inside walls and screening of a mess hall. The kerosene evaporated and left the DDT in the form of fine crystals attached to wood and screen. These crystals of DDT were responsible for the residual effect and would kill all mosquitoes and flies which lighted on them for the next three months or more. This method promises to be one of the most effective means of controlling insect-borne diseases in the future, particularly under conditions of civil life.



Fig. 2.—Member of a malaria survey unit looking for anopheline larvae in water from a rutted area.

DDT made possible the efficient use of the airplane in larvicidal work. Early work was done with cub airplanes that carried about 25 gallons of DDT solution which was sufficient to spray fifty acres. The use of airplane spraying grew from these small beginnings, so that, by the end of the war, personnel from the South Pacific had set up on Okinawa an airplane-spraying program which was successfully larviciding about twenty-five square miles of rice paddies at weekly intervals, and was also used to reduce fly populations which would have reached enormous numbers unless checked. It should be emphasized that airplane spraying did not replace the hard work of ground crews but it did effectively supplement their efforts.

SUPPRESSIVE MEDICATION

A discussion of our experience with atabrine or quinacrine as it is now known cannot be presented here. Some of the field studies have been published by Downs[6] and by Schaffer and Lewis.[7] It may be summed up by saying that quinacrine was an extremely valuable tool in our work but that mosquito con-

9. Vitamin A and ascorbic acid may be the substances that are stored by the breast-fed infant in quantities such as to give him greater resistance to respiratory infections in his second half year of life.

10. It seems reasonable to offer the artificially-fed infant vitamin A and ascorbic acid in quantities at least as great as he would receive if he were breast-fed and to include these in the diet of the first days of life. Two hundred and twenty I. U. of vitamin A per pound of body weight, and 100 mg of ascorbic acid in divided doses, are suggested as daily allowances.

11. It is hoped that the artificially-fed infant who receives adequate amounts of vitamin A and ascorbic acid will possess resistance to respiratory infections equal to that of the breast-fed baby.

CONCLUSIONS

It is natural and preferable to feed an infant at his mother's breast. If this is not practical, artificial feeding with cow's milk offers an adequate alternative. When the latter is carried out properly from all the standpoints which have been discussed, it seems to possess only one obvious disadvantage: the artificially-fed infant suffers from more respiratory infections during his second half year of life than does the breast-fed baby.

The notable difference between the dietary of the breast- and artificially-fed infant lies in the fact that the breast-fed baby receives more vitamin A and ascorbic acid and seems to utilize these vitamins better or to have less need of them. The Recommended Dietary Allowances for these vitamins of the Food and Nutrition Board of the National Research Council, as suggested for the 6- to 8-month-old infant, are low when compared to the amounts of them which the breast-fed infant receives.

It seems reasonable to allow the artificially-fed infant, beginning in the first days of life, 220 I. U. of vitamin A per pound of body weight daily, and 100 mg. of ascorbic acid daily offered in several divided doses, in the hope that this may lessen the incidence of respiratory infections which he suffers in his second half year of life.

The writer expresses his appreciation to Bertha S. Burke, Department of Maternal and Child Health, Harvard School of Public Health, and Jane Worcester, Department of Biostatistics, Harvard School of Public Health, for assistance in the preparation of this paper.

REFERENCES

1. Scevola de Sainte Marthé: La Paedotrophia, or The Art of Bringing Up Children, 1584: translated from the Latin by H. W. Tytler, London, 1797; quoted in Pediatrics of the Past, compiled by John Ruhrah (New York, 1925, Paul B. Hoeber, Inc., p. 508); quoted in Poet Physicians, compiled by Mary Lou McDonough (Springfield, Ill., 1945, Charles C Thomas, p. 11). Used by permission of both publishers.
2. Mueller, A. J. and Cox, W. M., Jr.: Comparative Nutritive Value of Casein and Lactalbumin for Man, Science 105: 580, 1947.
3. Gordon, H. H., Levine, S. Z., and McNamara, H.: Feeding of Premature Infants, Am. J. Dis. Child. 73: 442, 1947.
4. Stearns, G.: The Mineral Metabolism of Normal Infants, Physiol. Rev. 19: 415, 1939.
5. Holt, L. E. Jr., Tidwell, H. C., Kirk, C. K., Cross, D. M., and Neale, S.: Studies in Fat Metabolism I. Fat Absorption in Normal Infants, J. Pediat. 6: 427, 1935.
6. Powers, G. F.: Infant Feeding, J. A. M. A. 105: 753, 1935.
7. Grulee, C. G., Sanford, H. N., and Herron, P. H.: Breast and Artificial Feeding, J. A. M. A. 103: 735, 1934.

The lower part of Graph III shows the malaria rates on Guadalcanal over a period of twenty-seven months. The upper graph shows the rates on Bougainville which was occupied fifteen months later. There was severe and prolonged combat on Bougainville and difficult problems of malaria control which were in many respects equivalent to those on Guadalcanal. But malaria control groups went ashore with each division, malaria discipline was good, supplies were adequate The rates speak for themselves. Comparison of rates between divisions which arrived early in the campaign and those which arrived later show similar differences



Fig. 1.—Application of a DDT spray for residual effect to inside walls and screen of a mess hall.

Effective control of dengue fever and of other insect-borne diseases also was obtained by this organization.[3, a and b]

COMMENT

The importance of observations such as these to the civilian community is worthy of comment. Malaria is the world's number one scourge. It accounts for 10 to 50 per cent of the cases of infectious diseases treated in hospitals or dispensaries in many of the countries of south and east Asia and of the East Indies.[8] It is estimated that over 100,000,000 cases of malaria occur each year in India, only about 10 per cent of which are treated. There are many back-

OBSERVATIONS ON INSECT-BORNE DISEASES IN THE SOUTH PACIFIC CAMPAIGN

PAUL HARPER, M.D.
BALTIMORE, MD.

THIS paper will review briefly the importance of insect-borne diseases to a military force in the tropics and will describe the joint Army-Navy organization which was developed in the South Pacific Area to control these diseases. This organization was as nearly a joint service group as was possible at the time and many of its virtues and accomplishments resulted from this combined service use of personnel and of supplies.

Whatever this organization accomplished was due to the efforts of many individuals too numerous to mention. However, it is proper here to acknowledge the noteworthy contribution of two Navy officers,* who have described the broad outlines of the problem[1] and the control program.[2] Also, the valuable work of nonmedical specialists, especially entomologists, parasitologists, sanitary and civil engineers should be emphasized. A more detailed account of the work of these various groups is given elsewhere.[3]

Insect-borne diseases were the most serious health hazard experienced by our forces in the South Pacific Area during World War II. Malaria was the most important of these diseases and attacked approximately 100,000 men during a period when our total force in the area was not much over twice this number. For a time malaria jeopardized the success of the military campaign. Dengue fever and filariasis were the other two most important diseases. On some bases and for short periods dengue fever became a more serious problem than was malaria. This disease appeared in epidemic form in 1943 on New Caledonia, Efate, Espiritu Santo, and Tulagi-Florida. On Santo it affected approximately 25 per cent of the base strength in an epidemic described by Stewart.[4] "Mumu," which is the native term for the early manifestations of filariasis, caused the evacuation of several thousand troops, mostly from the Samoan Islands. Scrub typhus was a localized but very real problem on Bougainville, in an epidemic described by Anderson and Wing.[5] The organization which was developed to control these insect-borne diseases at first was concerned primarily with malaria, and the story of this disease will serve to illustrate the entire program.

The geographical area with which this paper is concerned comprised the malarious islands of the South Pacific Area and especially the eleven islands which were the scene of extensive operations by our forces. This chain of islands lay north of New Zealand and northeast of Australia. Guadalcanal was about the center of the chain, which was stretched out over 1,500 miles of ocean. To

*Captain J. J. Sapero, M.C., U.S.N., the first area malariologist, and his successor, Commander Fred Butler, M.C., U.S.N.

[Editor's Note: For his work in the control of insect-borne diseases, Dr. Harper received the Mead-Johnson Award for 1945 from The American Academy of Pediatrics. See J. Pediat. 30: 742, 1947.]

SUMMARY

The hazard of insect-borne diseases, notably malaria, to military operations in the South Pacific Area from 1942-1945 is presented together with a brief description of the organization and methods which were successful in combatting the problem.

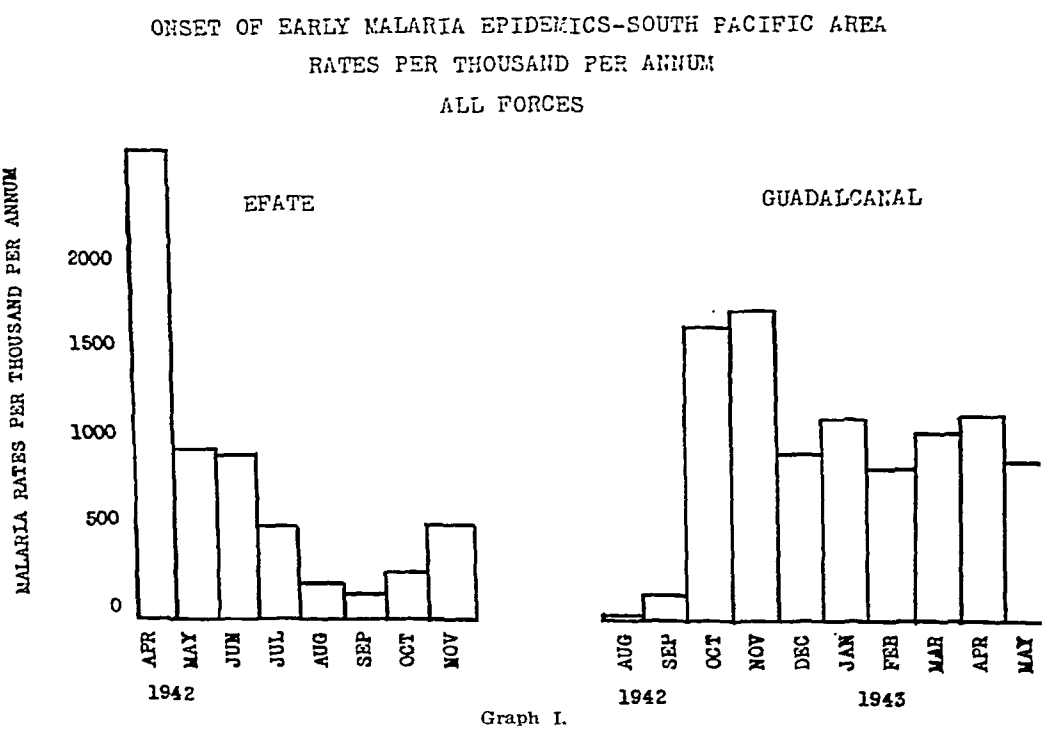
REFERENCES

1. Sapero, J. J., and Butler, F. A.: Highlights on Epidemic Disease Occurring in Military Forces in Early Phases of War in South Pacific, J. A. M. A. 127: 502, 1945.
2. Butler, F. A.: Malaria Control Program in a South Pacific Base, U. S. Navy Med. Bul. 41: 1603, 1943.
3. Malaria and Other Insect-Borne Diseases in the South Pacific Campaign, 1942-1945: Supplement to Am. J. Trop. Med. 27: 1947.
   I. Harper et al.: General Aspects and Control Measures, p. 1.
   II. Downs et al.: Epidemiology of Insect-Borne Diseases in Army Troops, p. 69.
   III. Oman, P. W., and Christiansen, L. D.: Entomology, p. 92.
   IV. Levine, N. D., and Harper, P.: Parasitological Observations on Malaria in Natives and Troops, and Filariasis in Natives, p. 119.
4. Stewart, F. H.: Dengue: Analysis of Clinical Syndromes at a South Pacific Base, U.S.N. Med. Bul. 42: 1283, 1944.
5. Anderson, W., and Wing, W.: Tsutsugamuchi Disease: A Study of Forty-nine Cases Occurring on Bougainville, War Med. 8: 163, 1945.
6. Downs, W. G.: Results in an Infantry Regiment of Several Plans of Treatment for Vivax Malaria, Am. J. Trop. Med. 26: 67, 1946.
7. Schaffer, A. J., and Lewis, R. A.: Atabrine Studies in the Field: I. The Relation of Serum Atabrine Level to Break Through of Previously Contracted Vivax Malaria, Bul. Johns Hopkins Hosp. 78: 265, 1946.
8. Strong, R. P.: Stitt's Diagnosis, Prevention and Treatment of Tropical Diseases, The Blakiston Co., Philadelphia, p. 1.

unhappily, they placed their eggs freely in road ruts and in shell holes. These man-made breeding places were estimated to account for more than 50 per cent of the mosquitoes on Guadalcanal. Mosquitoes breeding was aided by the high temperature and the heavy rainfall which averaged two to three times the rainfall which occurs along our north Atlantic seaboard.

Our troops fulfilled the last of the three conditions necessary for an epidemic. They were completely susceptible to all these insect-borne diseases.

Graph I shows the onset of the early malaria epidemics at Efate and at Gaudalcanal. A description of these epidemics will suffice to indicate the seriousness of the early situation.



Graph I.

Efate, in the New Hebrides Group, was occupied without opposition in March, 1942, by troops whose first task was to build an airfield. Their campsite was adjacent to the airfield and near a swamp and stream which later were discovered to be heavy breeding places of anopheline mosquitoes. Several hundred native laborers were encamped next to the troops and subsequently were found to be heavily seeded with malaria (Table I). Additional troops who were proceeding to a nonmalarious base and had their bed nets and other antimalaria supplies deep in the ship's hold, were diverted to Efate and landed early in April. The explosive outbreak of malaria which reached a rate of 2,678 per thousand per annum in April ensued from the close association of inadequately protected troops, infected natives, and anopheline mosquitoes.

TABLE I. LIST OF SURVIVALS

PATIENT	AGE	SEX	TREATMENT	YEARS SURVIVAL
P. B.	5 mo.	F.	Nephrectomy	15
M. E.	4 yr.	F.	Nephrectomy; postoperative irradiation	11
C. W.	27 yr.	M.	Nephrectomy	10
R. C.	3 yr.	M.	Nephrectomy	9
D. E. B.	16 mo.	F.	Preoperative irradiation; nephrectomy; postoperative irradiation	7½
D. C.	18 mo.	F.	Nephrectomy; postoperative irradiation	6½
D. W.	10 yr.	F.	Preoperative irradiation; nephrectomy; postoperative irradiation	4½
L. M.	3 days	M.	Preoperative irradiation; nephrectomy; postoperative irradiation	4½
J. B.	21 mo.	M.	Nephrectomy; postoperative irradiation	2½
R. A. H.	3 yr.	F.	Preoperative irradiation; nephrectomy; postoperative irradiation	2½

the most frequent presenting sign. Abdominal bulging, when it occurred, was usually anteriorly and laterally, in contradistinction to tumors of the adrenal which may bulge posteriorly. Abdominal pain was present in almost one-half of these patients and in several instances it occurred before the abdominal mass had been noted. Urinary symptoms were infrequent and not significant. Gross hematuria was much less frequent than either abdominal mass or pain but it occurred in three of the patients during some time in their disease. In one case hematuria was observed before a definite abdominal mass could be palpated. Vomiting, anorexia, malaise, and weight loss were present in some patients but these symptoms were usually associated with a large tumor mass or occurred late in the course of the disease.

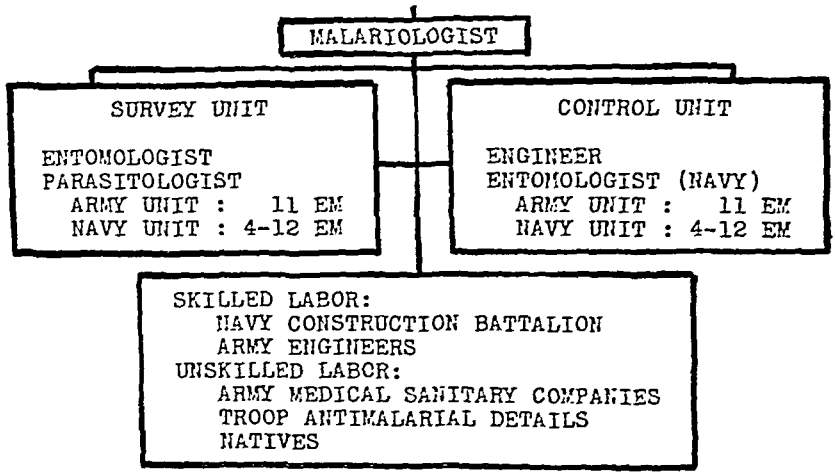
On physical examination, the most characteristic finding was an abdominal tumor mass which presented anteriorly or laterally, felt solid, was not tender, and usually had a smooth or finely nodular and rounded outline. In some patients the tumor occupied a large part of the abdominal cavity. The condition which gave the greatest difficulty in differential diagnosis was the neuroblastoma of the adrenal, but other conditions such as retroperitoneal sarcoma, polycystic kidney, hydronephrosis, lymphoma with marked enlargement of the liver or spleen, splenic or mesenteric cyst, ovarian tumor or cyst, and tuberculous peritonitis, should be considered. Since the hypernephroma or Grawitz tumor rarely occurs in early childhood, it should cause little difficulty in the differential diagnosis.

Of special interest in this series of cases was the presence of hypertension in seven out of eight patients in whom the blood pressure was recorded. The mechanism involved in the production of hypertension is not clear.[3] Bradley and Pincoffs[4] attributed the elevated pressure in patients with Wilms' tumor to the fact that the tumor tissue, like renal tissue, possessed the property of causing a rise in blood pressure. Horton[5] found that hypertension disappeared after removal of the primary tumor but that the blood pressure became elevated again when tumor metastases appeared. This would seem to support the possibility that some pressor substance, liberated by the tumor tissue, is responsible for the hypertension.

later. The engineer in command of the control unit was responsible for the work of most of the labor force shown in Graph II. Each engineer on the larger bases had from 100 to 250 men, exclusive of the antimalarial details, working under his general supervision. The malariologist was responsible for the coordination of the activities of all the persons in this organization.

It is to be emphasized that this group worked together as a team. Note that the personnel of the malaria control group could be either Army or Navy and that labor was also drawn from both services. On most islands the Army and Navy malaria control personnel lived in the same tents, ate at the same mess, and worked under a single malariologist.

BASIC GROUP
JOINT ARMY-NAVY MALARIA AND INSECT CONTROL
ORGANIZATION ON ISLAND BASES



Graph II.

One or more of the basic malaria control groups shown in Graph II were assigned to each island base according to the local needs. An island "Malaria and Epidemic Control Headquarters" was developed on Guadalcanal to coordinate the activities of the eight or more malaria control groups assigned there. Similar headquarters were set up on other large bases.

An important development was the attachment of such malaria control groups to combat divisions. These groups went ashore with the division and were responsible for the protection of combat troops from insect-borne diseases.

This whole organization was knit together by a small area headquarters consisting of a few Navy and Army Officers who had authority to travel throughout the area, and to inspect and recommend regarding the administration and coordination of malaria and epidemic control.

This organization began on Efate in July, 1942, with the arrival by air of one Navy officer (the first theater malariologist) and two enlisted technicians. Table III shows the size to which this organization had grown in the two years

TABLE II. PATIENTS WIT

PATIENT	AGE	SEX	DATE OF ENTRY	FIRST SYMPTOMS	DURATION OF SYMPTOMS	TRE PREOPERATI IRRADIATI
P. B.	5 mo.	F.	Oct. 1926	Abdominal pain	4 mo.	No
R. C.	3 yr.	M.	March 1927	Abdominal mass	1 week	No
P. F.	26 mo.	F.	Nov. 1927	Abdominal mass	2 weeks	No
L. C.	2 yr.	M.	March 1929	Anorexia	3 mo.	No
D. C.	18 mo.	F.	July 1931	Abdominal mass	5 mo.	No
M. E.	4 yr.	F.	Nov. 1932	Abdominal pain	4 mo.	No
C. W.	27 yr.	M.	Sept. 1934	a. Mass b. Polyuria	a. 10 yr. b. 6 mo.	No
R. E. H.	2 yr.	F.	July 1936	a. Poor wt. gain b. Hematuria	a. 6 mo. b. 4 mo. ago	No
M. K.	5 yr.	F.	Dec. 1936	Abdominal pain	3 mo.	No
I. J.	4 yr.	F.	July 1937	Poor appetite and fever	6 mo.	No
T. P.	21 yr.	M.	March 1938	Abdominal pain	2 mo.	No
D. E. B.	16 mo.	F.	March 1939	Poor wt. gain	4 mo.	Yes
J. C.	14 mo.	M.	Nov. 1939	Poor appetite	5 mo.	No
D. W.	10 yr.	F.	May 1942	Abdominal pain	6 weeks	Yes
L. M.	3 days	M.	June 1942	Abdominal mass	3 days	Yes
B. H.	2 yr.	F.	April 1943	Abdominal pain	6 mo.	No
J. B.	21 mo.	M.	Sept. 1944	Hematuria	1 week	No
R. A. H.	3 yr.	F.	Dec. 1944	Malaise	6 mo.	1. No 2. Yes

regarding the advisability of giving roentgen therapy before nephrectomy as well as after the tumor has been removed. Ladd and White[9] sponsor irradiation only after nephrectomy has been performed, since they believe that on a theoretical basis, preoperative roentgen therapy might facilitate the spread of metastases. They suggest that by eliminating preoperative irradiation and removing the tumor as soon as possible there would be less time and opportunity for metastases to take place to other parts of the body.

On the other hand, Priestly and Schulte[10] reported that they obtained their best results when nephrectomy was combined with both preoperative and postoperative roentgen therapy. Nesbit and Adams[11] have adopted the policy of reserving preoperative roentgen therapy for those cases in which the tumor is so large that operative removal would be very difficult technically. They recommend the use of postoperative irradiation in all patients.

The entomological section of the survey unit was responsible for information about mosquitoes and other insects. During the early epidemics no one who observed the population of adult anopheline mosquitoes had any doubt about the inadequacy of control operations. Later, as control measures became more effective, it was rare to find adult anophelines within the occupied area. Then the entomologists developed an index of mosquito breeding based on a system of larval counts which were obtained by regularly dipping samples from all water catchments in the controlled area. Fig. 2 shows one of the field survey men looking for larvae in water which he has just dipped from a road rut. These larval counts became our best criteria of the success of control measures and any unusual breeding was immediately reported to the oiling details.



Fig. 1.—Blood smear survey in native labor camp on Guadalcanal. Note open thatched type of construction of hut.

Larval control measures were directed toward the elimination or reduction in the amount of water for mosquito breeding and to the application of oil and other larvicides to the remaining breeding areas. Ditching operations were the most important of the measures designed to reduce the size of water catchments. Native labor, working with machetes, was the most efficient means of clearing vegetation preliminary to ditching. The ditching was done by draglines, by dynamite and by hand labor, in that order. Fig. 3 shows a member of a company antimalarial detail using a knapsack sprayer in his company area.

Malaria was controlled by such methods as these for the first three years. DDT was not available until the fall of 1944; then it greatly facilitated control efforts.

Measures directed against adult mosquitoes included the use of bed nets, screening, repellents, and sprays of the pyrethin type until the introduction of DDT gave a powerful new attack. It was discovered that a single application of DDT sprayed onto a wood, canvas, or screen surface would have a so-called "residual-effect" which would kill mosquitoes and many other insects for the next three or four months. It was soon apparent that one of the most important uses of DDT was to spray the inside of native huts and of our own quarters for this residual action.

through a transperitoneal approach has been used in several of our recent patients. From this small series no definite conclusion is possible regarding the best operative technique.

RESULTS AND PROGNOSIS

Ladd and White[9] summarized the literature on embryoma of the kidney in 1941 and they found thirty-eight probable cures out of 563 cases reported up to that time. The best series they noted were those of White,[12] who had two probable cures out of nine patients, Kretschmer,[2] with twenty-four cases and three cures, and Higgins and Shively,[13] who reported four survivals out of twenty-six patients. Ladd and White's series consisted of sixty operative cases with fourteen patients alive for at least two years, a survival rate of 23.3 per cent.

Since 1941, there have been a few more reports of comparatively large series of patients as well as several reports on the survival of one or two patients.[14] Weisel, Dockerty, and Priestley[15] have reported forty-two operated patients with seven patients alive from two to twenty years later. Dean[16] reported twenty patients with Wilms' tumor in whom irradiation was the only form of therapy, with five patients being alive five years later. However, it was not stated whether a pathologic diagnosis was made in all of these patients before therapy was started. Nesbit and Adams[11] had twelve patients in whom nephrectomy was performed and seven of them (58.4 per cent) were alive three and one-half to eleven and one-half years postoperatively. They also reported one patient with Wilms' tumor who had questionable chest metastases and was alive ten years after being treated with roentgen irradiation alone.

Our present series consists of eighteen patients with Wilms' tumor with ten survivals out of the thirteen patients who had a nephrectomy, a survival rate of 76.9 per cent.

It was not possible to trace any relationship between a particular symptom or sign and the outcome following adequate treatment. Both our oldest and youngest patient, aged 27 years and 3 days respectively, at the time of entry into the hospital, survived. There was no correlation noted in the group between age at onset and the end result. Only three of our patients had gross hematuria and all three of these patients survived. This is in contrast with the findings of Ladd and White, who noted that the ten patients in their series with this condition died. An elevated blood pressure before operation was not found to be a bad prognosis sign in our series since five of the seven patients with hypertension whose tumor were removed by nephrectomy are among those who are living.

One patient (J. B.) developed pulmonary metastases seven months after nephrectomy. He received roentgen irradiation to the involved area with rapid disappearance of the lesions, and he is alive and well more than two years later with no evidence of recurrence. Kerr[17] has reported the case of a 4-year-old girl who had pulmonary metastases which cleared after irradiation, and who was alive and well fifty-two months after treatment.

trol was always the most important factor in malaria control. In fact, it was a theater policy to discontinue quinacrine suppression as soon as mosquito-control had reduced the transmission of malaria to a point where this was a safe procedure.

It is probable that the extremely low mortality rates and the rarity of blackwater fever was due to the wide use of suppressive atabrine. Over a two-year period, at the time when the incidence of malaria was at a peak, there were thirty-four deaths in more than 78,000 cases of malaria in army personnel, or a mortality rate of 0.0004. Atabrine was effective in suppressing both vivax and falciparum malaria, and had a curative action in the full sense of the word on the latter species



Fig. 3.—Member of a company antimalarial detail using a knapsack sprayer.

RESULTS

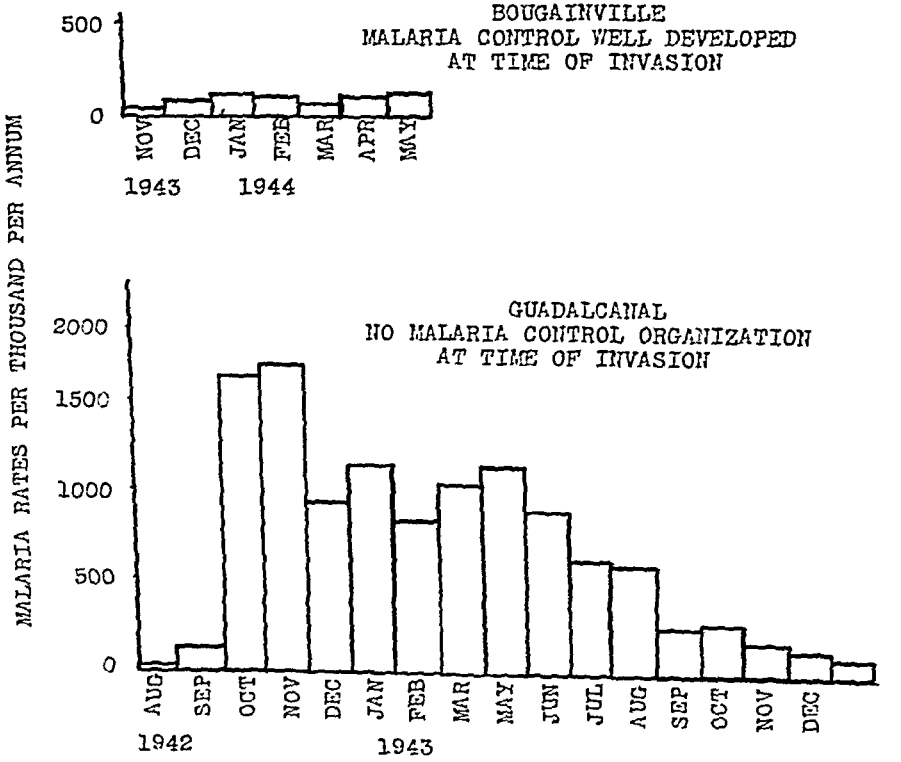
One way to demonstrate the results of this insect control program will be to show graphs of malaria rates on a base occupied early in the campaign when there was no insect control organization as compared with the rates on a base occupied in the latter part of the campaign after the program had been well established.

5. Horton, B. T.: The Relationship of Hypertension to Renal Neoplasm, Proc. Staff Meet., Mayo Clin. 15: 472, 1940.
6. Koons, K. M., and Ruch, M. K.: Hypertension in a 7 Year Old Girl With Wilms' Tumor Relieved by Nephrectomy, J. A. M. A. 115: 1097, 1940.
7. Page, I. H.: The Production of Persistent Arterial Hypertension by Cellophane Perinephritis, J. A. M. A. 113: 2046, 1939.
8. Daniel, W. E.: The Hypertensive Factor in Wilms' Tumor, South. M. J. 32: 1014, 1939.
9. Ladd, W. E., and White, R. R.: Embryoma of the Kidney (Wilms' Tumor), J. A. M. A. 117: 1858, 1941.
10. Priestley, J. T., and Schulte, T. L.: The Treatment of Wilms' Tumor, J. Urol. 47: 7, 1942.
11. Nesbit, R. M., and Adams, F. M.: Wilms' Tumor, J. PEDIAT. 29: 295, 1946.
12. White, W. C.: Wilms' Mixed Tumor of the Kidney, Ann. Surg. 94: 139, 1931.
13. Higgins, C. C., and Shively, F. L.: Malignant Renal Neoplasms in Children: Review of Twenty-Six Cases, Arch. Surg. 42: 386, 1941.
14a. Ockerblad, N. F., and Carlson, H. E.: Wilms' Tumor: With Report of an Eight Year Cure, J. Urol. 50: 265, 1943.
b. Daw, W. J.: Wilms' Tumor, Penn. M. J. 46: 1293, 1943.
c. Rowe, E. W., and Frazer, M.D.: Roentgen Therapy of Wilms' Tumor, Radiology 42: 107, 1944.
d. Sugarbaker, E. D.: An Application of Staging in the Removal of Difficult Wilms' Tumor, Ann. Surg. 120: 901, 1944.
e. Mandeville, F. B., and Nelson, C. M.: Wilms' Tumor of Kidney with Five Year Survival Following Preoperative Roentgen Therapy and Nephrectomy, Urol. and Cutan. Rev. 49: 204, 1945.
15. Weisel, W., Dockerty, M. B., and Priestley, J. T.: Wilms' Tumor of the Kidney: A Clinicopathologic Study of Forty-Four Proved Cases J. Urol. 50: 399, 1943.
16. Dean, A. L.: Wilms' Tumor, New York State J. Med. 45: 1213, 1945.
17. Kerr, H. D.: Treatment of Malignant Tumors of the Kidney in Children, J. A. M. A. 112: 408, 1939.

ward areas where there is little hope for lasting improvement in health or economy until this disease is conquered. Included in this category are the malarious islands of the South Pacific.

Two of the most immediately valuable developments of wartime research are DDT and the newer antimalarial drugs. One of the most interesting possibilities is the application of DDT residual spray to dwellings as the sole means of controlling malaria and dengue fever. This type of control was tried out with favorable results in the latter part of the war. DDT also was used to impregnate bed nets and preliminary tests indicated that this was a valuable procedure.

COMPARISON OF MALARIA RATES
BEFORE AND AFTER DEVELOPMENT OF MALARIA CONTROL ORGANIZATION



Graph III.

The shortage of quinine led to the wide use of and careful pharmacological study of atabrine and other drugs, notably chloroquin and paludrine. We now have drugs which in the case of faciparum malaria will exert a causal prophylactic effect and a cure in the full sense of the word. The problem of safe drugs with comparable action against vivax malaria remains.

age of 5,000 units. The penicillin in this report was given in the first ounce of a regular feeding. Buchanan[11] treated twenty-one infants with neonatal infections, using 4,000 units per pound of expected body weight per twenty-four hours orally in the first ½ ounce of a regular feeding. "Immediate striking results" were obtained. A few patients relapsed but responded to a second course.

From these reports it seemed possible that oral penicillin might find a place on an infant ward in the treatment of infections. This experimental study was undertaken therefore, to determine if penicillin is indeed absorbed from the alimentary tract of young infants and what blood levels may be expected.

PROCEDURE

The usual intramuscular dose of penicillin on the infant wards of this hospital is 5,000 to 10,000 units every three hours. It was decided to give two to four times this amount orally, and 20,000 units were given in one dose throughout this experiment.

The subjects used varied from one week of age to approximately 5 months. The weights ranged from 6 to 12 pounds. All the infants were free from infection.

Twenty-two determinations in all were made.

The penicillin was dissolved in water so that 20,000 units were contained in 5 to 10 c.c. of water. It was then put in a formula bottle and given to the infant and followed by a regular feeding.

At the start of the experiment, four serum levels were obtained at the following times; one-half, one, two, and three hours after the ingestion of the penicillin. This was later cut down to three levels taken at one, two, and three hours after administration of the drug, and it was finally cut to two serum determinations at one and three hours after ingestion of the penicillin. It was felt after the first six determinations, that information regarding blood levels was important at the end of the first and third hours. This materially reduced the technical work involved, yet still gave the information most desired. In five cases, because of the findings of Henderson and McAdam,[10] serum determinations were carried out at the end of four and six hours.

The method of penicillin assay used was the serial dilution method recommended by MacLeod[12] and used by the Army Air Forces. The test organism was the C-203 M.V. strain of Group A beta hemolytic streptococcus. The sensitivity of this organism was consistently found to be 0.015 units of penicillin per cubic centimeter. Sensitivity tests on the organism were done at weekly intervals.

Rammelkamp and Keefer,[13] in 1943 showed a sensitivity of hemolytic streptococcus to penicillin in a range from 0.019 to 0.156 units and most staphylococci were demonstrated to be sensitive to a penicillin concentration of 0.165 units per cubic centimeter or less. Meads[14] and his co-workers, in 1945, using a serial dilution method, did sensitivity studies on a great number of strains of the organisms found in the infections which are usually treated with

WILMS' TUMOR (EMBRYOMA OF THE KIDNEY)

HENRY K. SILVER, M.D.
SAN FRANCISCO, CALIF.

WILMS' tumor (embryoma of the kidney) is a highly malignant tumor which originates in the kidney and is probably congenital. Patients with this tumor formerly were considered to have an extremely poor prognosis, but recent reports have shown that an appreciable number of patients will survive following nephrectomy and roentgen irradiation.

This report is based on a series of eighteen patients with Wilms' tumor of the kidney who were seen at the University of California Hospital between 1926 and 1944. The diagnoses in all cases were made by pathologic study of specimens obtained at operation or autopsy. Thirteen of these patients had a nephrectomy and ten of these are alive from two and one-fourth to at least fifteen years since treatment was instituted. (Table I).

DIAGNOSIS

Wilms' tumor is the most common abdominal neoplasm in children and almost all solid tumors of the kidney in early life are of this variety. The tumor characteristically grows very rapidly. However, Moore[1] has reported a case in a man aged 56 years, where a tumor was definitely known to be present for at least sixteen years, and in one of our patients (C. W.), aged 27 years, a mass in the abdomen was first noted 10 years before admission to the hospital. Metastasis takes place by direct extension or by way of the lymphatics or blood stream to other parts of the body, but in most patients the abdominal mass may became quite large before metastasis occurs.

There is a great variety and complexity of the microscopic findings in Wilms' tumor, and this great variation accounts in part for the multitude of names given to the neoplasm in the past: sarcoma, adenosarcoma, sarcocarcinoma, mixed tumor of the kidney, embryonal adenomyosarcoma, etc. Smooth and striated muscle cells, epithelial cells, and even bone and cartilage may be found in the tumor. Kretschmer[2] pointed out that all of the characteristic cell types usually are found if complete histologic studies are made of the tumors.

In most cases, Wilms' tumor appears before the age of 6 years, and fifteen of the eighteen patients in this series were less than 6 years old at the time of onset of their symptoms. Our youngest patient was only 3 days old when admitted to the hospital, and his mother had had difficulty in delivery because of the child's abdominal enlargement which had been produced by the tumor mass. Two of our patients were adults. The oldest was 27 years of age at the time of admission to the hospital, while another patient was 21 years of age. Eleven of the patients were females and seven were males.

The symptoms in this series of patients were similar to those reported by other authors. Abdominal enlargement or palpation of an abdominal mass was

From the Department of Pediatrics, University of California Medical School.

patients (No. 18, 20, and 22) showed levels which are considered therapeutically inadequate. One (No. 19) showed a high level of 0.120 units per cubic centimeter. This was an 83-day-old infant who had one and three-hour levels of 0.240 unit per cubic centimeter. At the end of six hours no penicillin was found in the serum of any of the five patients tested.

CURVE SHOWING AVERAGE AND INDIVIDUAL LEVELS

OF SERUM PENICILLIN CONCENTRATIONS

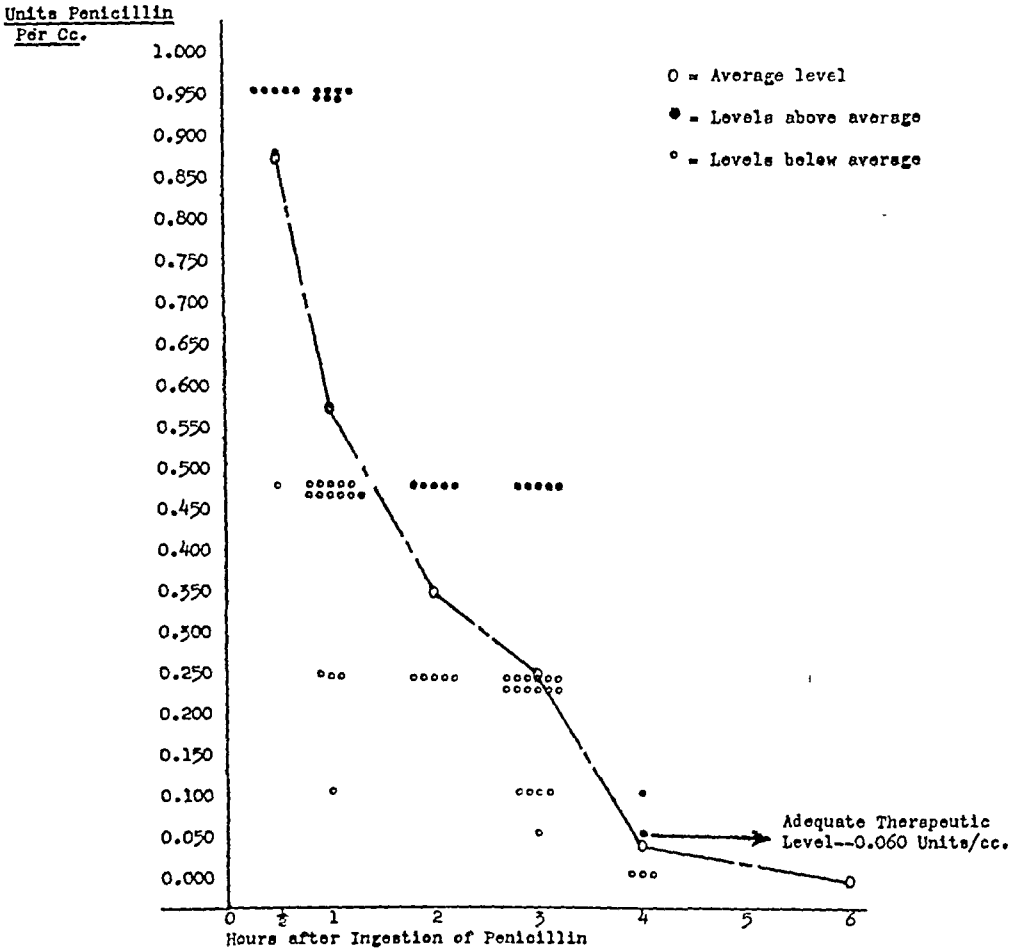


Fig. 1.

DISCUSSION

Although penicillin serum levels were not determined on adults or older children in this study, it seems clear that the levels obtained in young infants following oral administration are consistently higher than those generally found in older individuals. This difference may be due to several factors.

On the other hand, Koons and Ruch[6] have described a case of a 7-year-old girl with hypertension who was cured after nephrectomy in spite of the existence of metastases in other parts of the body. These authors suggested that the increase in blood pressure might be caused by interference with renal circulation when the renal pedicle has been invaded by the tumor tissue. Furthermore, they suggested that the neoplastic mass surrounding the kidney may act in the same manner as the cellophane envelopes used by Page[7] to produce experimental hypertension. Daniel[8] also studied the blood pressure in patients with Wilms' tumor and out of eighteen cases he found moderate or extreme elevation in fourteen instances. He was not able to demonstrate a pressor substance in the tumor tissue and he was of the opinion that renal ischemia, produced mechanically by the tumor, frequently accounted for the hypertension. He suggested that the persistence of the hypertension following nephrectomy might be due to sclerotic changes in the arteries of the other kidney which had been produced before operation by the prolonged arterial hypertension.

PYELOGRAPHY

Retrograde and intravenous or subcutaneous pyelography are of aid in diagnosing Wilms' tumor of the kidney. The tumor causes distortion of the renal pelvis and displacement of the kidney and ureter, and in some cases there is failure of visualization of the involved kidney pelvis. It has been pointed out that pyelography also has real merit in determining the presence and normality of the kidney of the opposite side and its use is indicated to determine the condition of the opposite kidney, even when there is little doubt concerning the diagnosis of Wilms' tumor.[9] Since retrograde pyelography requires general anesthesia and is a very traumatic procedure in male infants, subcutaneous or intravenous pyelography should be tried first. If these are not successful, and if pyelograms are necessary, cystoscopic examination is indicated.

BIOPSY

Aspiration biopsy was not attempted in any of the patients in this series, since it was felt that this procedure might dislodge malignant tumor cells into adjacent areas or set cells loose into the blood stream and thus increase the chances of metastases to some distant site. However, taking a biopsy is not necessarily associated with the early spread of metastases to other organs. One of our patients (R. A. H.) was operated for a suspected ruptured appendix and at operation a tumor of the kidney was found. Biopsy of the tumor mass was taken and after the diagnosis of Wilms' tumor was made she received a course of roentgen irradiation. A nephrectomy was done five weeks later and this was followed by another course of roentgen therapy. The patient is alive and well two and one-fourth years after the biopsy.

TREATMENT

Most authors agree that the best treatment of Wilms' tumor is nephrectomy plus roentgen irradiation. However, there is still considerable controversy

strated that stool emulsions produced 80 to 100 per cent destruction of penicillin, whereas the same emulsion passed through a Seitz filter had no destructive action, thereby proving the inactivation of penicillin by penicillinase-producing organisms in the gastrointestinal tract. There is, however, no direct evidence that there are fewer penicillinase-producing organisms in the gastrointestinal tracts of young infants.

All twenty-two serum determinations in this study showed penicillin concentrations over and above levels necessary to inhibit the usual susceptible organisms up to and including three hours after administration. Penicillin administered orally would, therefore, seem to be a safe and practical method of treating infections in infants caused by the ordinarily penicillin-sensitive organism.

SUMMARY

1. Penicillin (20,000 units in water) was given to twenty-two infants ranging in age from one week to 5 months and ranging in weight from 6 to 12 pounds.

2. Serum levels were determined one-half, one, two, three, four, and six hours after ingestion of the penicillin.

3. At one-half hour, the average of six measurements was 0.880 unit per cubic centimeter. At one hour the average of twenty-two measurements was 0.584 unit per cubic centimeter. At two hours the average of ten measurements was 0.360 unit per cubic centimeter. At three hours the average of twenty-two measurements was 0.265 unit per cubic centimeter. At four hours the average of five measurements was 0.045 unit per cubic centimeter. At six hours no penicillin was found in the serum of the five infants tested.

4. All the levels up to and including three hours after ingestion were therapeutically adequate.

5. Some of the factors which might be involved in producing high, sustained levels in young infants after oral administration of penicillin are discussed.

The author wishes to thank Dr. L. Emmett Holt, Jr., and Dr. Robert Ward for helpful criticism and advice in the writing of this paper. The author also wishes to thank Miss Jeanette Winters, Bacteriologist, Children's Medical Service, Bellevue Hospital, for her technical assistance.

REFERENCES

1. McDermott, W., Bunn, P. A., Benoit, M., Dubois, R., and Haynes, R.: Oral Penicillin, Science 101: 228, 1945.
2. Bunn, P. A., McDermott, W., Hadley, S. J., and Carter, A. C.: The Treatment of Pneumococcic Pneumonia With Orally Administered Penicillin, J. A. M. A. 129: 320, 1945.
3. Oberst, F. W., Foter, M. J., and Nielson, F. A.: Blood Levels and Urinary Excretion after Oral Penicillin, J. Medicine 27: 696, 1946.
4. Free, A. H., Parker, R. F., and Biro, B. E.: Oral Penicillin, a Comparison of Various Modes of Administration, Science 102: 666, 1945.
5. Finland, M., Meads, M., and Ory, E. M.: Oral Penicillin, J. A. M. A. 129: 315, 1945.
6. Seager, L. D.: Blood Levels of Penicillin after Oral Administration with Various Antacids, Science 103: 353, 1946.
7. Gyorgi, R., Evans, K. W., Rose, E. K., Perlingiero, J. G., and Elias, W. F.: Oral Penicillin, Penn. Med. J. 49: 409, 1946.
8. Burke, F. G., Ross, S., and Strauss, C.: Oral Administration of Penicillin, J. A. M. A. 128: 83, 1945.

'ILMS' TUMOR OF THE KIDNEY

ENT					
NEPHRECTOMY		POST-OPERATIVE IRRADIATION	BLOOD PRESSURE	COURSE	COMMENT
DATE	TYPE OF INCISION				
Oct. 1926	Posterolumbar	No		Alive at least 15 yr.	
March 1927	Posterolumbar	No	96/66	Alive at least 9 yr.	Tumor adherent to surrounding structures at operation.
0	0	Yes		Dead	Biopsy and removal of part of tumor only.
0	0	No	.	Dead	At operation tumor considered inoperable.
Aug. 1931	Posterolumbar	Yes	118/90	Alive at least 6½ yr.	
Nov. 1932	Posterolumbar	Yes		Alive at least 11 yr.	
Sept. 1934	Posterolumbar	No	140/90	Alive at least 10 yr.	
July 1936	Posterolumbar	No		Dead	Developed metastases to neck 4 mo. after operation.
0	0	No		Dead	Had pressure atrophy of liver.
July 1937	Posterolumbar	Yes		Dead	At operation retroperitoneal extension.
0	0	Yes	140/90	Dead	Biopsy only: tumor considered inoperable.
June 1939	Posterolumbar	Yes	130/100	Alive 7½ yr.	Prolonged bleeding time before operation.
Nov. 1939	Posterolumbar	Yes		Dead	At operation retroperitoneal extension.
June 1942	Transperitoneal	Yes	142/110	Alive 4½ yr.	Developed diabetes mellitus after operation.
July 1942	Transperitoneal	Yes		Alive 4½ yr.	Developed kyphosis after roentgen irradiation. Sibling died "cancer of kidney."
0	0	Yes	170/110	Dead	Biopsy only: tumor considered inoperable; metastases to liver.
Sept. 1944	Posterolumbar	Yes		Alive 2½ yr.	Pulmonary metastases 7 mo. after operation; treated with irradiation; alive 2 yr. later.
1. Dec. 1944 2 March 1945	1. Biopsy 2. Transperitoneal	2. Yes	150/90	Alive 2¼ yr.	First operation for suspected appendicitis.

No standard treatment was used for the series of cases presented here. (Table II). Preoperative irradiation was first used by us in 1939 and since that time it has been employed chiefly in those patients in whom some technical difficulty was to be expected at operation. In one instance (B. H.) successful primary surgical removal of the tumor was impossible because of the extreme vascularity of the tumor mass and the presence of numerous friable veins. After roentgen therapy was given the patient was re-explored and it was found that there had been a marked decrease in the vascularity of the tumor. In this patient, at least, it was felt that preoperative irradiation would have increased the chances of survival by obliterating some of the blood vessels and permitting removal of the tumor mass at the time of the first operation.

The majority of patients in this series in whom a nephrectomy was done had their kidneys removed through a posterolumbar incision, but nephrectomy

ORAL PENICILLIN IN THE PROPHYLAXIS OF RECURRENT RHEUMATIC FEVER

MARTIN M. MALINER, M.D., AND SOL DARRELL AMSTERDAM, M.D.
BROOKLYN, N. Y.

INNUMERABLE studies using sulphonamides as a prophylactic drug in recurrences of rheumatic fever have been reported. These varied from the earliest sulphanilamide through sulphadiazine and sulphamerazine. The Army and Navy, with vast numbers of individuals under control and observation, contributed much to the experimental evaluation of such chemoprophylactic measures.

Most of these studies are predicated upon the idea that the rheumatic disease occurs shortly after an upper respiratory infection due to certain types of the hemolytic streptococcus. The probable chain of events is: first, the initiating upper respiratory infection of one to three days' duration caused by particular hemolytic streptococci, followed by a latent interval of one to three weeks during which some phenomenon, either allergic, immunologic, or otherwise, takes place, subsequently followed by the clinical manifestations of the rheumatic infection in any of its protean forms.[1]

Holbrook[2] found as many as 50 per cent of certain susceptible persons had a recrudescence of rheumatic fever within two to three weeks following an upper respiratory infection. Hugh Morgan, in 1943, reported that "90 per cent of youths in World War II who suffered attacks of rheumatic fever while stationed in some army camps had an immediate previous streptococcus infection with an average latent period of sixteen days before the symptoms of rheumatic fever developed."[3] Massel and Jones found, "At some army posts actual epidemics of rheumatic fever resulted when upper respiratory infections due to hemolytic streptococci were prevalent."[4]

According to Hansen, "The very characteristic feature of rheumatic fever is its tendency to occur in repeated episodes. The high mortality and morbidity are due to the recurrences of the infection; less than 1 per cent of the patients die during the initial attack, whereas 25-40 per cent die within 10-20 years following the onset. The large difference between the immediate and ultimate mortality may well be due to the tendency of this disease to strike in repeated episodes of rheumatic activity."[1]

The vast majority of individuals have more than one attack. Roth and coworkers[5] have found a 68 per cent recurrence rate in 488 children; Bland and Jones,[6] in 1,000 children found a 66 per cent recurrence rate and Wilson,[7] in 673 children, reports a recurrence rate of 85 per cent. In children Roth[5] finds that 73 per cent had a recrudescence within three years after the initial attack. The recent military experience indicates, however, that even many years may elapse before a recurrence appears.

From the Pediatric Cardiac Clinic of the Post-Graduate Medical School and Hospital of New York, N. Y.

TABLE III. RESULTS OF NEPHRECTOMY FOR WILMS' TUMOR

TREATMENT	OUTCOME		SURVIVAL TIME OF LIVING PATIENTS
	ALIVE	DEAD	
Nephrectomy alone	3	1	15 yr., 10 yr., 9 yr.
Nephrectomy plus postoperative irradiation	3	2	11 yr., 6½ yr., 2½ yr.
Preoperative irradiation plus nephrectomy and postoperative irradiation	4	0	7½ yr., 4½ yr., 4½ yr., 2¼ yr.
Total	10	3	

The treatment used in the management of our patients varied considerably. Since preoperative roentgen therapy was first used in 1939, all of those who are alive more than seven and one-half years were treated by nephrectomy alone or by nephrectomy plus postoperative irradiation (Table III). All of those patients who had preoperative irradiation plus nephrectomy and postoperative irradiation are still alive. However, only four patients were treated by this method and it will be interesting to see whether this method of therapy will continue to give the best results.

SUMMARY AND CONCLUSIONS

1. A series of eighteen patients with Wilms' tumor of the kidney is presented. A nephrectomy was done in thirteen of these patients and ten of these are alive from two and one-fourth to fifteen years postoperatively, a survival rate of 76.9 per cent.

2. Two of the patients were adults, while the youngest patient was only 3 days old at the time of entry to the hospital.

3. Hypertension occurred in seven of the eight patients in whom the blood pressure was recorded.

4. No correlation was noted between age of onset, degree of hypertension, presence of hematuria, and the eventual outcome.

5. No standard treatment was used in the management of these patients, but all four patients who received preoperative irradiation plus nephrectomy and postoperative irradiation are alive.

6. Every patient who survived had had a nephrectomy.

7. The data available are insufficient to permit the evaluation of the merits of the transperitoneal as compared with the posterolateral approach to the kidney.

Sincere thanks for permission to report these cases are expressed to the Departments of Pediatrics, Surgery, Urology, Radiology, Pathology, and Medicine of the University of California Medical School.

REFERENCES

1. *Moore*, T.: A Mixed Tumor of the Kidney in an Adult, Brit. J. Surg. 30: 381, 1943.
2. Kretschmer, H. L.: Malignant Tumors of the Kidney in Children. J. Urol. 39: 350, 1938.
3. Braun-Menéndez, E., Fasciolo, J. C., Leloir, L. F., Muñoz, J. M., and Taquini, A. C.: Renal Hypertension, Springfield, Ill., 1946, Charles C. Thomas.
4. Bradley, J. E., and Pincoffs, M. C.: The Association of Adeno-myo-sarcoma of the Kidney (Wilms' Tumor) with Arterial Hypertension, Ann. Mt. Med. 11: 1613. 1938.

Forty-four children were under observation. Twenty-two received the penicillin troches and the others were followed as controls. During the first year of our experiment, these latter received parallel pellets of milk sugar as a placebo. This was discarded as unnecessary during the second year. In the penicillin group there were twelve boys and ten girls. In the control group there were eleven boys and eleven girls.

TABLE I

	AGE IN YEARS			
	1-3	4-6	7-10	11-13
Controls	1	3	10	8
Penicillin	0	1	7	14

	CARDIAC DIAGNOSIS			
	POSSIBLE HEART DISEASE	POTENTIAL (RHEUMATIC HISTORY)	RHEUMATIC (MITRAL DIS.)	CONGENITAL
Controls	3	7	8	4
Penicillin	2	4	11	4

Both control and penicillin cases had similar type histories and cardiac manifestations. The congenitals were included to ascertain the value of the drug in the prevention of subacute bacterial endocarditis.

OBSERVATIONS

We were not only interested in the question of rheumatic fever but also in learning the possible value of the penicillin in the prevention of so-called upper respiratory infections. Fifteen mothers, of the twenty-two patients receiving penicillin, stated that the general health of their children was much better and that they had fewer upper respiratory infections than prior to taking the penicillin and that when these did occur they were not severe. One mother stated that her child did do better in general, but that the child had frequent colds during both years under observation. Three children had frequent colds both winters. Two mothers were noncommittal and saw no improvement. These reports intimated that the troches were not a panacea and apparently did not prevent the common cold. None of the twenty-two patients receiving the penicillin lozenges developed rheumatic fever. In the control group, four children developed definite attacks of acute rheumatic fever. The following are the histories:

CASE REPORTS

CASE 1.—J. F., an 11-year-old white girl with a history of rheumatic polyarthritis and mitral insufficiency dating back to 1944, was sent to a convalescent cardiac institution where she remained for eighteen months. One year later in April, 1947, she developed a typical history of rheumatic fever beginning with an upper respiratory infection followed in two weeks by torticollis and chorea.

CASE 2.—S. P., an 8-year-old white girl, was first diagnosed as having rheumatic mitral insufficiency at the age of 4 years. She was free from any activity until March, 1947, when, following an upper respiratory infection, she developed joint pains, temperature, rapid pulse, and variations in the cardiac status. All laboratory data, including sedimentation rates, x-ray, and blood counts, corroborated the diagnosis of acute rheumatic fever.

ORAL PENICILLIN IN INFANTS

GEORGE S. HUSSON, M.D.
NEW YORK, N. Y.

THE obvious advantages of orally administered penicillin have attracted the attention of many workers, who have attempted to treat infections with this very effective antibiotic. Some of the early results were discouraging, but more recently, due to a clearer understanding of the factors involved in the administration of oral penicillin, this method holds great promise for the future in the treatment of infections caused by susceptible organisms.

McDermott and co-workers,[1] in 1945, demonstrated that penicillin given orally, using four to five times the intramuscular dose, produced adequate serum levels. In this study, it was also demonstrated that plain tap water was just as effective a vehicle as any other used (beeswax, antacids, etc.). Bunn and McDermott[2] treated forty-five cases of pneumococcus pneumonia and showed comparable results with oral penicillin as with intramuscular penicillin, if four to five times the intramuscular dose was given. Each patient was given a high initial dose orally, as was given when patients were treated with intramuscular penicillin.

Oberst[3] and associates showed that results obtained with oral penicillin combined with antacids were, on an average, similar to the results obtained when penicillin was administered in aqueous solution. Free, Parker, and Biro[4] in 1945, came to the same conclusion. Finland[5] also demonstrated that penicillin in saline gave as good levels as when given with buffer preparations. The doses administered were the usual intramuscular doses.

Seager's[6] results, however, demonstrated that oral penicillin was more effective in producing higher and more sustained levels when given with antacids than when it was given in tap water. Gyorgi[7] and associates, in 1946, in treating children ranging in age from 2 to 9 years, showed higher and more sustained levels with trisodium citrate-buffered penicillin than with penicillin in plain water.

Burke,[8] in 1945, and also Finland [5] in the same year, demonstrated higher serum levels when oral penicillin was given before meals. Libby,[9] in 1945, showed the advantage of administering oral penicillin before meals, and many other workers have agreed on the better levels obtained on the fasting stomach.

Henderson and McAdam,[10] in 1946, obtained high and sustained serum concentrations in infants to whom oral penicillin was administered experimentally. In infants under one month, with a dose of 100,000 units, bacteriostatic levels were obtained as long as fifteen hours after administration. With 10,000 units, bacteriostatic levels were obtained up to six hours. In nine infants ranging in age from one month to one year, 100,000 units produced adequate levels for six hours. Adequate levels in premature infants were obtained with a dos-

From the Department of Pediatrics, New York University College of Medicine and the Children's Medical Service, Bellevue Hospital.

CEREBRAL ABSCESS: A COMPLICATION OF CONGENITAL CARDIAC DISEASE (FALLOT'S TETRALOGY)

Report of Two Cases With Diagnosis and Operation

Alfred Hand, M.D.
Philadelphia, Pa.

THE boy whose history is given here and whose mother was told when he was 3 months old that he had a heart murmur, was 4½ years of age when first seen by me; cyanosis was moderate at times, all the distal phalanges were clubbed, the heart was enlarged, and there were several murmurs. One year later when I was called to see him he had an upper respiratory infection, nasal obstruction, headache, temperature of 101.2° F., and pulse of 105, the highest figures recorded in all the illness, the temperature ranging from 98° to 99.8° F., rarely 100.8° F., and the pulse coming down in a few days to 78, 66, 52, with a low of 48. The headache ceased on the third day when he seemed well, but it and the slight rise of fever returned on the fourth day and persisted. There was occasional purulent nasal discharge. Vomiting occurred a few times until the seventeenth day, when all food was rejected, and in the evening he had an attack of stiffening of the arms and legs, head held back, eyes rolled up, face white, and he screamed as if in sharp pain for twenty minutes, when he relaxed and wept for ten minutes. The next day examination showed pupils equal and reacting to light, no opisthotonos, knee jerks marked, ankle clonus distinct on right, slight on left, Babinski and Kernig negative, no evidence of otitis, and no vomiting. Another attack of stiffening the next day with pulse 48 and temperature 98° F., suggested Stokes-Adams' syndrome, so Dr. W. D. Stroud of the Children's Heart Hospital was called, the boy having another spastic attack as we entered the room. Dr. Stroud thought it did not resemble Stokes-Adams, attributing the bradycardia rather to intracranial pressure from either thrombosis, embolism, or abscess in the brain. Lumbar puncture was done on the twenty-first day taking 3 c.c. of clear fluid dropping at the normal rate. Eye-ground examination by Dr. Hunter Scarlett showed veins distended and very dark, disc outlines fuzzy, and the discs slightly swollen almost to 1 diopter. Radiologic examination of the head by Dr. Manges gave a negative result. The temperature was 98.2° F. but the blood count found a leucocytosis of 16,000. On the twenty-second day the right arm was not moved as much as the left, the tongue protruded to the right, and the right eye could not be abducted beyond the middle line. Dr. W. G. Spiller, the neurologist, confirmed the suspicion of brain abscess, left-sided, and the boy was at once taken to the Hospital of the University of Pennsylvania; where the brain-surgeon, Dr. Charles H. Frazier, trephined in the left temporal region, evacuating 42 c.c. of yellowish green,

Read at the meeting of the American Pediatric Society in Stockbridge, Mass., May 15, 1917.

penicillin. The vast majority of the organisms tested were susceptible to a concentration of penicillin of 0.06 unit per cubic centimeter or less. A few resistant strains of meningococcus, staphylococcus and *Hemophilus hemolyticus* were reported in this study.

From the above data, an adequate therapeutic level of penicillin should be not less than 0.06 unit per cubic centimeter, unless the organism involved is tested and found to be more sensitive. In this study, therefore, levels of 0.060 unit of penicillin per cubic centimeter or over were considered adequate.

RESULTS

In all determinations made, up to and including three hours after ingestion, adequate therapeutic levels of penicillin in the serum were obtained.

In the six determinations made at the end of half an hour, five showed levels of 0.960 unit of penicillin per cubic centimeter. In levels taken at the end of one hour, seven out of twenty-two still showed a concentration of 0.960 unit per cubic centimeter. The lowest serum concentration at the end of one hour was 0.120 unit. This was in a 150-day-old, 10-pound Mongolian idiot (No. 21). In ten determinations taken at the end of two hours, levels ranging from 0.480 to 0.240 unit per cubic centimeter were obtained. In the three-hour determinations a maximum of 0.480 and a minimum of 0.060 unit of penicillin per cubic centimeter was obtained. The latter comparatively low level was in a 61-day-old, 10-pound infant (No. 16).

Five determinations were made four and six hours after the administration of oral penicillin. As can be seen in Table I, at the end of four hours, three

TABLE I. PENICILLIN SERUM LEVELS IN INFANTS FOLLOWING ORAL ADMINISTRATION

PATIENT	AGE (DAYS)	WEIGHT (LB.)	PENICILLIN LEVELS IN UNITS PER C.C.					
			½ HR.	1 HR.	2 HR.	4 HR.	3 HR.	6 HR.
1	6	7	--	0.240	--	0.480	--	--
2	8	6	--	0.960	--	0.480	--	--
3	11	7	0.960	0.960	0.480	0.240	--	--
4	12	7	0.480	0.480	0.240	0.240	--	--
5	14	7	0.960	0.480	0.240	0.240	--	--
6	16	8	--	0.480	--	0.240	--	--
7	20	6	0.960	0.960	0.480	0.240	--	--
8	22	6	--	0.960	--	0.240	--	--
9	30	8½	--	0.480	0.240	0.240	--	--
10	30	10	0.960	0.960	0.480	0.240	--	--
11	31	9	0.960	0.480	0.480	0.240	--	--
12	42	6½	--	0.480	0.240	0.240	--	--
13	49	6	--	0.480	0.480	0.480	--	--
14	50	7	--	0.480	0.240	0.240	--	--
15	58	8	--	0.240	--	0.480	--	--
16	61	10	--	0.480	--	0.060	0.060	0.000
17	62	11	--	0.960	--	0.480	--	--
18	64	7	--	0.480	--	0.240	0.015	0.000
19	83	8	--	0.240	--	0.120	0.120	0.000
20	103	12	--	0.480	--	0.120	0.015	0.000
21	150	10	--	0.120	--	0.120	--	--
22	153	12	--	0.960	--	0.120	0.015	0.000
Average	49	8	0.880	0.584	0.360	0.265	0.045	0.000

the Graduate Medical School of the University of Pennsylvania a patient with this type of congenital heart lesion, I found, in the chapter on "Diseases of the Heart," written by G. A. Sutherland, the statement, "It is an old-standing clinical observation that cases of congenital heart disease often suffered or died with signs of cerebral abscess or embolism. . . . It was recognized that venous thrombosis, septic or otherwise, was usually present in some other part of the body and it was assumed that some portion of the thrombus had been detached and passed into the blood-stream. The problem was as to how the embolus had passed through the lungs, which are the natural destination of a venous thrombus.



FIG. 1.—Case 1. Larger abscess in left temporosphenoidal region drained at operation, smaller abscess in left occipital lobe and third abscess in left parietal area not shown.

In these cases of paradoxical embolism there is present an opening in the ventricular septum and the embolus, passing through this, reaches the left ventricle and is then carried into the cerebral arteries. A similar explanation will hold good when there is a persistent foramen ovale or a patent ductus arteriosus."

At the meeting of the Medical Society of the State of Pennsylvania in 1940, Dr. Harold Krauss reported to the Pediatric Section abscess of the frontal lobe of otitic origin, and in the discussion it was agreed that the majority of cerebral abscesses in children are probably secondary to otitis or paranasal sinusitis, but I added that there is one class of pediatric patients who are specially susceptible to develop brain abscess from infection in any part of the body, the

In 1941, Abraham and his associates[15] showed that oral penicillin was, to a great extent, destroyed by the acid content of gastric juice. The dosage range used was similar to that of intramuscular penicillin, namely 10,000 to 20,000 units. Rammelkamp and Keefer,[16] in 1943, substantiated Abraham's work and showed that gastric acidity was a definite factor in the inactivation of orally administered penicillin. In 1943, Rammelkamp and Helm,[17] using the same dosage as in intramuscular injections, and instilling the penicillin directly into the duodenum obtained serum penicillin levels comparable to those obtained with intramuscular injection. Free, Parker, and Biro,[4] on the other hand, showed that gastric acidity is not so great an obstacle to oral penicillin administration as was originally believed. It was demonstrated by these workers that urinary penicillin excretion was the same whether penicillin was instilled directly into the duodenum or given by mouth to adults with acid gastric juice.

If the factor of gastric acidity is an obstacle to the absorption of ingested penicillin, it is much less so in the infant group. Miller[18] has shown that the maximum acidity of infant gastric secretions occurs during the first twenty-four hours of life, when it may reach adult levels. The theory offered to explain this phenomenon is that of placental transmission of maternal hormone (gastrin), which soon dissipates itself after the birth of the infant (Smith[19]). This acidity declines from birth until the tenth day of life, after which gastric acidity begins to rise again but never reaches adult levels until the third year. This was shown by both histologic and biochemical studies. Birth weight was shown to bear a direct relationship to gastric secretions, and achlorhydria was found quite frequently, especially in the lower birth weight groups. This factor may account in part for the high penicillin levels obtained in almost all determinations in this study.

The relative inefficiency of the infant kidney may be another factor of considerable importance in the production of the high sustained serum concentrations of orally administered penicillin. Using clearance studies on urea, inulin, sodium, and chlorides, McCance and Young[20, 20a] in 1937, demonstrated this relative inefficiency of the infant kidney. Gordon[21] and his associates also demonstrated the inefficiency of the infant and especially premature kidneys by urea clearance studies. Free[22] pointed out in 1944, that absorption of orally administered penicillin continues over a longer period than when it is given parenterally. Penicillin was also shown by Free to be rapidly excreted in the urine. The average amount of ingested penicillin which was excreted in the urine was between 10 and 33 per cent, and maximum urinary excretion occurred during the first hour after oral ingestion and fell off significantly thereafter. No penicillin was detectable at the end of six hours. An inefficient kidney would therefore, seem to be an advantageous factor in the development of high penicillin levels initially and in the maintenance of high levels.

A third factor which may result in higher levels in the serum of young infants after receiving oral penicillin than is seen in adults ingesting comparable doses, is the possibility that there are fewer penicillinase-producing organisms in the infant gastrointestinal tract. Bunn and McDermott,[23] in 1946, demon-

the diagnosis of any focal neurologic damage or meningitis. Certainly only early recognition will permit successful surgical intervention and hope for cure of this uncommon syndrome.



Fig. 3.—Case 2. Apex of heart to right, high liver shadow to left; autopsy showed left auricle and ventricle atrophic, the right being much hypertrophied and the heart practically bilocular; liver on the left, stomach, pancreas, and spleen on the right.

Dr. Robbins' comments impelled me to delve into notes of 20 years ago to place this case on record. A visit was made to the University Hospital to consult the autopsy records and Dr. Frazier's able successor, Dr. Francis C. Grant, on learning the object of the call, not only gave permission to inspect all the records, but also added the great and greatly appreciated favor of offering the notes of another case operated on recently in his department, to be included in this report. His patient, a girl 8 years of age, recovered after the operation, going home a month later, but was brought back after two weeks with fever, unconsciousness, and symptoms of a second abscess; the site of the first abscess was explored with negative results, but lumbar puncture showed acute meningitis and the patient succumbed after forty-eight hours. Autopsy disclosed a second abscess (Fig. 2)

9. Libby, R. L.: Oral Administration of Penicillin in Oil, Science 101: 178, 1945.
10. Henderson, J. L., and McAdam, I. W. J.: Oral Administration of Penicillin to Infants, Lancet 1: 922, 1946.
11. Buchanan, J.: Penicillin in Infancy and Childhood, Lancet 2: 560, 1946.
12. MacLeod, C.: Personal Communication.
13. Rammelkamp, C. H., and Keefer, C. S.: Penicillin and Its Antibacterial Action in Whole Blood and Serum for Hem. Strep. and Staph. Aureus, J. Clin. Investigation 22: 649, 1943.
14. Meads, M., Ory, E. M., Wilcox, C., and Finland, M.: Penicillin Sensitivity of Strains of Six Common Pathogens and of Hemophilus Hemolyticus, J. Lab. and Clin. Med. 30: 725, 1945.
15. Abraham, E. P., Florey, H. W., Chain, E., Fletcher, C. M., Gardner, A. D., Heatley, N. G., and Jennings, M. A.: Further Observations on Penicillin Lancet 2: 177, 1941.
16. Rammelkamp, C. H., and Keefer, C. S.: Absorption, Excretion, and Distribution of Penicillin, J. Clin. Investigation 22: 425, 1943.
17. Rammelkamp, C. H., and Helm, J. C.: Studies on Absorption of Penicillin from the Stomach, Proc. Soc. Exper. Biol. & Med. 54: 324, 1943.
18. Miller, R. A.: Observations on Gastric Acidity During the First Month of Life, Arch. Dis. Child. 16: 22, 1941.
19. Smith, Clement A.: Physiology of the Newborn Infant, Springfield, Ill., 1946, Charles C. Thomas.
20. McCance, R. A., and Young, W. F.: Secretion of Urine by Newborn Infants, J. Physiol. 99: 265, 1941.
20A. Young, W. F., Hallum, J. L., and McCance, R. A.: Secretion of Urine by Premature Infants, Arch. Dis. Child. 16: 243, 1941.
21. Gordon, H. H., Harrison, H. E., and McNamara, H.: Urea Clearance of Young Premature and Full Term Infants, J. Clin. Investigation 21: 409, 1942.
22. Free, A. H., Leonards, J. R., McCullagh, D. R., and Biro, B. E.: Urinary Excretion after Oral Administration to Normal Human Subjects, Science 100: 431, 1944.
23. McDermott, W., Bunn, P. A., Benoit, M., Dubois, R., and Reynolds, M. E.: Absorption of Orally Administered Penicillin, Science 103: 359, 1946.

5. Those patients who live to be adults, as some do, should also be told, as tactfully as possible, that in any attack of acute illness, watch should be kept for any unusual symptom not felt before; a severe headache, twitchings of any muscles or loss of power, disturbance of vision, and such should be reported promptly to the doctor, in order that proper steps may be taken early; but that the patient should dismiss from his mind all thought of these as long as he is well.

6. All these patients in whom pulmonary stenosis, defect of the ventricular septum, coarction of the aorta, or patent ductus arteriosus is definitely proved or even suspected, should be examined by a surgeon especially trained in surgery of this closure of a patent ductus, or of anastomosis of the pulmonary artery with the aorta or one of its branches, or of excision of the narrowed aorta. The improvement in oxygenation following the operation of anastomosis undoubtedly favors improvement in the general health even if it may not lessen the possibility of paradoxical embolism. It is said of the operation for occlusion of the patent ductus arteriosus that it lessens the tendency to develop acute endarteritis or endocarditis which these patients are likely to show even in adult life, but it will certainly remove the possibility of brain abscess by paradoxical embolism. It would therefore seem to be strongly indicated in these ductus patients, unless there is some equally strong contraindication.

The peak age for the onset of rheumatic fever is 6 to 8 years of age in contrast to the peak age from 11 to 13 years of age for the reactivation of the infection.[5] Wilson[8] observed that the likelihood of a recurrence before and after 16 years of age was 5:1.

With the above in mind, the authors believed that if the number of streptococcal sore throats could be reduced, the frequency of recurrences of rheumatic fever would be decreased.

Our observations took place at the Pediatric Cardiac Clinic of the New York Post-Graduate Hospital during the fall, winter, and spring seasons of 1945 to 1946 and 1946 to 1947. We used penicillin troches[9] as our prophylactic agent. The purpose of the experiment was to introduce the antibiotic at the actual site of the probable focus for the growth of the hemolytic streptococci, namely, the pharynx. We believe it would be more effective to have the therapeutic agent acting directly upon the focus of infection rather than to depend upon chemotherapeutic agents which require a definite blood level to achieve the necessary effect. An additional advantage with the use of penicillin over the sulpha drugs is that repeated leucocyte, hemoglobin, differential counts, and urine analysis are not required. Janet Baldwin[10] concludes in her recent report, "Despite our good fortune in not encountering serious toxic manifestations, it is to be emphasized that such should be watched for and that a total white cell and polymorphonuclear count should be followed for at least the first two months of the prophylactic therapy with the sulpha drugs. The urine should be followed for albumin and red cells at regular intervals throughout the treatment."

In our clinic in 1945 to 1946 we used lozenges of 1,000 oxford units of penicillin, and in 1946 to 1947 these were increased to 5,000 oxford units. The patients were advised to suck the troche slowly about one hour after each meal. A sufficient supply was distributed to last at first for two weeks, and was later increased to a month's supply, after which the patients were to report for their usual check-up. This was repeated during the fall, winter and spring months when the upper respiratory infections were most prevalent. A careful record of the cardiac, rheumatic, and symptomatic manifestations was charted at each visit.

For a preliminary study, as this one was, facilities for routine throat cultures before and after therapy were not available at that time. We feel, of course, that these procedures are important in an investigation of this kind and this will be done in a follow-up study. Levine and Hoyt[11] have reported an experiment which might shed some light as to the efficacy of local penicillin in the throat. Their subjects were told to chew on a paraffin base gum which incorporated 10,000 oxford units of penicillin. They took repeated saliva samples and found a level of 1.0 or more units per cubic centimeter saliva which persisted for over three hours. At three and one-half hours it dropped to less than 0.25 unit per cubic centimeter.

Rammelkamp and Keefer[12] found that 0.3 unit of penicillin is the upper limit needed for bacteriostasis of susceptible bacteria in plasma.

Laboratory Results.—On September 26, urine examination was negative except for one plus actone. Microscopic examination showed 4 to 5 leucocytes per high power field. Blood count was: 94 per cent hemoglobin with 14.2 Gm.; 4.45 erythrocytes; 16,840 leucocytes with a differential count of 25 stab and 30 segmented cells, 44 lymphocytes and one monocyte with moderate toxic granulations. The carbon-dioxide combining power was 16 volumes per cent. Stool culture obtained on September 26 showed a growth of *Bacillus coli.* Stool examination was negative for blood ova and parasites. Stool cultures of September 30 and October 1, were negative for typhoid and dysentery groups. Complete blood examinations were made at about five-day intervals during the infant's hospital stay. The erythrocytes ranged between 3.91 and 4.98. The leucocyte count fell to 12,700 on September 30, then rose to 34,050 on October 7. On October 12, it was down to 18,400. The differential count remained essentially unchanged, showing a constant preponderance of the granulocytic series. However, on September 30, 8 eosinophiles were found to be present, and in succeeding counts the eosinophiles ranged between two and seven per 100 cells. On September 30, the blood sulfadiazine level was 15.1 mg. per cent. The carbon-dioxide combining power showed marked fluctations, corresponding to the degree of acidosis. On September 27, it was 40 volumes per cent; October 2, 36 volumes per cent; October 7, 26 volumes per cent; October 8, 8 volumes per cent; October 9, 5 volumes per cent; October 10, 33 volumes per cent; and October 12, 25 volumes per cent.

The baby was isolated on admission and started on ½ oz. of 5 per cent glucose by mouth every two hours. Forty cubic centimeters of plasma were given intravenously immediately and 200 c.c. of normal saline were given every three hours. On the evening of admission a formula was started containing evaporated milk diluted with molar lactate. On September 27, breast milk was started, and 1¼ oz. was given every three hours in ¾ oz. of boiled water. The breast milk was gradually increased as tolerated to 2½ oz. every three hours. On September 27, sulfadiazine, gr. 2½, was started and given every six hours. The infant received 50 c.c. of blood or 50 c.c. of plasma on alternate days throughout the remainder of her hospital course. Daily infusions of 150 c.c. of Ringer's lactate solution were given subcutaneously. The temperature remained elevated throughout the first week in the hospital, never going below 100°F. and with daily spikes as high as 103°F. Throughout this time the stools were liquid, yellow to whitish green, foul smelling and were expelled projectilely. The infant averaged nine to ten such stools every day. In spite of the number of stools, hydration seemed adequate and the skin rash cleared rapidly, so that by October 3, it had disappeared. She became distended on several occasions and on September 30 had two episodes of vomiting. However, enemas seemed to relieve the distention and the vomiting. Adequate vitamin therapy was given throughout the hospital stay. Between October 3 and October 8, the temperature gradually fell to a normal level under the above-outlined therapy but the infant continued to have between ten and fifteen liquid stools every day. The weight fell from 5 lb., 13 oz., on admission to 5 lb. on October 6. On October 9, the infant showed Kussmaul type of respirations and the carbon-dioxide combining power was 5 volumes per cent. Examination revealed a bilateral otitis media, and bilateral myringotomy was performed. Forty cubic centimeters of 5 per cent sodium bicarbonate were given intravenously. The respirations were slower and the child seemed improved; however, the stools did not change appreciably. Distention remained a problem. On October 13, the respirations became quite labored and in spite of oxygen therapy they ceased at 5:20 P.M.

Pathologic Report.—In the mesentery, numerous discrete, firm lymph glands were demonstrated. These were moderately enlarged and were seen throughout the mesentery up to its root. No enlargement of the lymph glands was demonstrated in the pelvis. Approximately two inches distal to the third part of the duodenum in the jejunum was a small segment of intestine, which appeared to be knuckled on itself, describing a horseshoe curve, so that a part of this knuckled loop appeared to be in contact with the other part.

Just above this area in the mesentery was a spot of whitish colored material, no larger than a drop or two, which looked like pus. When these two loops were dissected, there was in the proximal one a small area no larger than the head of a pencil, in which the serosa was

CASE 3.—M. S., a 10-year-old white girl with yearly recurrences of chorea in 1943, 1944, and 1945 had a new attack of chorea in April, 1947. This patient's heart appears to be normal.

CASE 4.—J. Z., a 13-year-old white boy, was first hospitalized for rheumatic fever in 1943. At this time there was a carditis with complete heart block which cleared up and the patient was well until March, 1947, when an attack of polyarthritis occurred.

TABLE II. FINDINGS IN FOUR PATIENTS DEVELOPING RHEUMATIC ACTIVITY (NO PENICILLIN)

NAME	PRESENT DIAGNOSIS	FEVER	ARTHRITIS	TACHYCARDIA	NEW MURMURS	ELEVATED SED. RATE	PROLONGED P-R	INCREASED HEART SIZE	CHOREA
J. F.	R.H.D. M.I. Chorea	+	+	+	+	23,67	−	−	+
S. P.	R.H.D. M.I.	+	+	+	−	80,48,30	−	+	−
M. S.	Chorea	−	−	−	−	22	−	−	+
J. Z.	R.H.D. M.I.	+	+	+	−	47,30	−	−	−

SUMMARY AND CONCLUSION

We have reported our observations on forty-four children seen at the New York Post-Graduate Pediatric Cardiac Clinic. Twenty-two received penicillin troches prophylactically and the remaining twenty-two children were observed as controls without penicillin. None of the children receiving the penicillin prophylaxis developed signs of rheumatic activity, whereas four of twenty-two control cases presented definite attacks of rheumatic fever.

In conclusion, we cannot make any definite statements about the use of penicillin as a prophylactic measure in rheumatic fever, but we do feel that our results are very encouraging and warrant further detailed study. The possibilities for the use of penicillin as a prophylactic agent and its advantages over chemoprophylaxis are indicated. A more detailed study may definitely help to establish penicillin as the agent of choice in rheumatic fever prophylaxis.

REFERENCES

1. Hansen, A. E.: J. PEDIAT. 28: 296, 1946.
2. Holbrook, W. P.: J. A. M. A. 126: 84, 1944.
3. Morgan, H.: U. S. Dep't of Labor. Proc. Oct. 5, 1943. Children's Bureau pub. no. 308. 4: 1943.
4. Massell, B. F., and Jones, T. D.: Am. Heart J. 27: 575, 1944.
5. Roth, I. R. et al.: Am. Heart J. 13: 36, 1937.
6. Bland, E. F., and Jones, T. D.: J. A. M. A. 113: 1380, 1939.
7. Wilson, M. G.: Rheumatic Fever. New York, 1940, The Commonwealth Fund.
8. Wilson, M. D.: J. PEDIAT. 10: 456, 1937.
9. Penicillin Troches called Ledercillin (5000U.) furnished by the Lederle Laboratories. New York.
10. Baldwin, J.: J. PEDIAT. 30: 284, 1947.
11. Levine, M. G., and Hoyt, R. E.: J. A. Pharm. Ass. Scientific Ed. 35: 346, 1946.
12. Rammelkamp, C. H., and Keefer, C. S.: J. Clin. Investigation 22: 649, 1943.
13. Dodge, K., Baldwin, J. S., and Weber, M. W.: J. PEDIAT. 24: 483, 1944.
14. Kuttner, A. G., and Reyersbach, G. J.: Clin. Invest. 22: 77, 1943.
15. Hench, P., and Rosenblatt, E.: J. A. M. A. 132: 976, 1946.
16. Hench, P., and Rosenberg, E.: Med. Clin. N. A. 30: 489, 1946.
17. Coburn, A. F.: Am. J. Dis. Child. 70: 339, 1945.

The mother stated that the child's stools were continually greenish since discharge from the hospital. On Sept. 8, 1946, the stools became more green than usual, watery, frequent (eight to twelve daily), but not foul. Two days later a purplish area developed on the right buttock which became inflamed. Diarrhea persisted, and hospital admission was sought.

On admission the temperature was 99.2° F., weight 7 lb., 13 oz. He was well developed, well nourished, crying, and in apparent distress. The fontanella were not depressed. The skin was of normal texture. Physical examination was negative except for a raised, red, warm area on the inner side of the right buttock. The abdomen was not distended, and showed no tenderness, rigidity, fluid, or masses.

Laboratory Results.—On admission urine examination was entirely normal. Blood count was: hemoglobin, 84 per cent with 12.6 Gm.; erythrocytes, 4.02; leucocytes, 12,700; differential, stab cells 17 per cent, segmented cells, 29 per cent, lymphocytes, 47 per cent, and monocytes, 7 per cent, with moderate toxic granulation. Subsequent findings were as follows: The urine occasionally showed a trace of albumin. There was a progressive anemia from a hemoglobin of 84 per cent, red blood cells, 4.02 on September 23, to a hemoglobin of 47 per cent, red blood cells, 2.43 on October 21. Granulocytes showed a shift to the left late in the hospital course with a differential on October 19, of premyelocytes, 1 per cent; myelocytes, 2 per cent; juvenile cells, 5 per cent; stab cells, 12 per cent; segmented cells, 4 per cent; lymphocytes, 69 per cent; and monocytes, 1 per cent. Turk cells and normoblasts were present in specimens of October 19 and 21. The white blood cell count on October 7 was 25,350; on October 12, 6,600; on October 19, 13,200; and on October 21, 4,300. Blood chemistry revealed blood chlorides, 367 mg. per cent; sodium chloride, 600 mg. per cent; urea, 35 mg. per cent; and urea nitrogen, 16 mg. per cent. The carbon-dioxide combining power was 21 volumes per cent on October 3 and 18 volumes per cent on October 21. Stool culture of September 26 was positive for *Bacillus coli*, but negative for the typhoid and dysentery groups. Stool cultures of September 27 and October 2 were negative for the typhoid and dysentery groups.

On admission the boil on the right buttocks was incised, and foul smelling pus was evacuated. After incision this lesion healed rapidly. Powdered lactic acid milk formula was given with adequate vitamin therapy. The child took all feedings hungrily, and retained all food. The stools continued being liquid or semiliquid, yellowish to greenish in color, and occasionally showed curds. There was a progressive weight loss to 6 lb., 11 oz. by October 9. From October 9 to 18 there was some slight increase in weight, so that on the latter date it was back to 7 lb. 7 oz. The temperature frequently spiked to 101° F. On October 3, respirations became accelerated and the abdomen somewhat distended. On October 5, the distention became a major problem and all feedings, except tea, were stopped. A cannula was inserted in the saphenous vein. M/6 Na-lactate, plasma, 5 per cent glucose, and whole blood were given. On October 6 a formula of boiled skimmed milk was started. Penicillin, 10,000 units, every three hours, was given. A half dram of Kaopectate was given every two hours. On October 10 the child refused the formula and became listless. A solution containing one Gm. of potassium chloride, 1.5 Gm. of sodium chloride, 20 c.c. of M-lactate, 355 c.c. of water, and enough glucose (5 per cent) to make 750 c.c., was given in 4 oz. feedings every four hours. Plasma and whole blood were given intravenously on alternate days. On October 12 the abdomen became quite distended and hard. A rectal tube and Pituitrin S brought no relief. On October 16 sulfadiazine was started. By October 21 abdominal distention was so pronounced that respirations became embarrassed. However, the temperature remained normal. On October 22 abdominal distention was tremendous. The child was irritable, respirations were labored, and there was regurgitation of fecal material. An enema returned yellow fecal material, but the distention was not relieved. The temperature was 101° F., pulse 128. Prostigmine was given without relief of distention. A constant rectal tube being ineffectual, a Wangensteen drainage was started. Continuous oxygen was given, but the respirations remained poor and ceased at 8:20 P.M.

Pathologic Report.—On opening the peritoneal cavity, a foul odor was noted. The loops of the bowel were matted together by lacy adhesions. Approximately 200 c.c. of yellow fluid was present. The bowel was markedly distended. The bowel wall appeared shiny. Strands

turbid fluid of offensive odor; cultures showed no growth but smears revealed many polynuclears and gram-positive diplococci. The boy lived two days longer.

The thorough autopsy confirmed the clinical diagnosis of pulmonary stenosis with defect of the ventricular septum and hypertrophy of both ventricles (dextroposition of the aorta, as in Fallot's tetralogy, not being mentioned); there was thickening of the aortic and pulmonic valves and of the conus, suggesting chronic fibrous endocarditis, and on one of the aortic valves was a red vegetation 2 mm. in diameter; there was an acute esophagitis with purulent exudate unrecognized during life.

Dr. Frazier, after studying the brain with Dr. Winkelman, the neurologist, wrote down several points of interest: (1) the principal abscess (Fig. 1) had not ruptured into the ventricles; (2) there was not a well-defined abscess wall; (3) there was a second abscess in the occipital lobe on the same side and a similar focus of infection in the parietal lobe. Furthermore, there was no evidence of meningitis when the brain was removed nor was there any evidence of communication with the mastoid, middle ear, or any of the sinuses. It would seem, therefore, that possibly the abscesses, especially in view of their multiple character, were vascular in origin.

I witnessed the post-mortem examination and at my request the pathologist opened the mastoid cells through the inner plate, finding no inflammation at all.

None of us apparently thought of the two conditions of the heart and brain as being anything else than a coincidence, for no mention was made of any relationship between them. Speaking for myself, I had no such idea up to that time, but several years later, when looking through some of the early Transactions of the Society, read in the 1894 volume a paper by Dr. W. P. Northrup with the title "Congenital Pulmonary Stenosis (conus arteriosus): Incompleteness of Septum Ventriculorum: Cyanosis: Abscess of the Brain: Death at 4½ Years. (Specimen shown.)" And in the 1895 volume, Dr. George N. Acker, under the title "A Case of Cardiac Anomaly" reported the history of a girl 6 years old, developing an abscess in the right temporosphenoidal lobe; and following him, Dr. A. Jacobi read a paper "Patent Ventricular Septum in a Man of 29 Years." This patient also developed an abscess in the upper posterior part of the left temporosphenoidal lobe. Then, in the discussion of these papers, Dr. Frederic A. Packard told of a hospital patient who had been working up to two days before admission, showing Jacksonian epilepsy of the right arm but no cyanosis (when asked about it, he said he had never had it), the symptom getting worse, coma ensued, with death on the third day "the autopsy showing patent foramen ovale and a defect in the ventricular septum, each large enough to admit a finger, and the brain having an abscess." Dr. Packard did not mention the size nor the location of the abscess.

Five cases in all then gave the thought that there might be some reason for the association of these two distinct conditions, so a search was made through textbooks without avail. But about two years later, with the acquisition of an English work, *Diseases of Children*, edited by Garrod, Batten, Thursfield, and Paterson, and in consulting it while demonstrating to the Class in Pediatrics of

The mother stated that the child's stools were continually greenish since discharge from the hospital. On Sept. 8, 1946, the stools became more green than usual, watery, frequent (eight to twelve daily), but not foul. Two days later a purplish area developed on the right buttock which became inflamed. Diarrhea persisted, and hospital admission was sought.

On admission the temperature was 99.2° F., weight 7 lb., 13 oz. He was well developed, well nourished, crying, and in apparent distress. The fontanella were not depressed. The skin was of normal texture. Physical examination was negative except for a raised, red, warm area on the inner side of the right buttock. The abdomen was not distended, and showed no tenderness, rigidity, fluid, or masses.

Laboratory Results.—On admission urine examination was entirely normal. Blood count was: hemoglobin, 84 per cent with 12.6 Gm.; erythrocytes, 4.02; leucocytes, 12,700; differential, stab cells 17 per cent, segmented cells, 29 per cent, lymphocytes, 47 per cent, and monocytes, 7 per cent, with moderate toxic granulation. Subsequent findings were as follows: The urine occasionally showed a trace of albumin. There was a progressive anemia from a hemoglobin of 84 per cent, red blood cells, 4.02 on September 23, to a hemoglobin of 47 per cent, red blood cells, 2.43 on October 21. Granulocytes showed a shift to the left late in the hospital course with a differential on October 19, of premyelocytes, 1 per cent; myelocytes, 2 per cent, juvenile cells, 5 per cent; stab cells, 12 per cent; segmented cells, 4 per cent; lymphocytes, 69 per cent; and monocytes, 1 per cent. Turk cells and normoblasts were present in specimens of October 19 and 21. The white blood cell count on October 7 was 25,350; *on October 12, 6,600; on October 19, 13,200; and on October 21, 4,300. Blood chemistry* revealed blood chlorides, 367 mg. per cent; sodium chloride, 600 mg. per cent; urea, 35 mg. per cent; and urea nitrogen, 16 mg. per cent. The carbon-dioxide combining power was 21 volumes per cent on October 3 and 18 volumes per cent on October 21. Stool culture of September 26 was positive for *Bacillus coli*, but negative for the typhoid and dysentery groups. Stool cultures of September 27 and October 2 were negative for the typhoid and dysentery groups.

On admission the boil on the right buttocks was incised, and foul smelling pus was evacuated. After incision this lesion healed rapidly. Powdered lactic acid milk formula was given with adequate vitamin therapy. The child took all feedings hungrily, and retained all food. The stools continued being liquid or semiliquid, yellowish to greenish in color, and occasionally showed curds. There was a progressive weight loss to 6 lb., 11 oz. by October 9. From October 9 to 18 there was some slight increase in weight, so that on the latter date it was back to 7 lb. 7 oz. The temperature frequently spiked to 101° F. On October 3, respirations became accelerated and the abdomen somewhat distended. On October 5, the distention became a major problem and all feedings, except tea, were stopped. A cannula was inserted in the saphenous vein. M/6 Na-lactate, plasma, 5 per cent glucose, and whole blood were given. On October 6 a formula of boiled skimmed milk was started. Penicillin, 10,000 units, every three hours, was given. A half dram of Kaopectate was given every two hours. On October 10 the child refused the formula and became listless. A solution containing one Gm of potassium chloride, 1.5 Gm. of sodium chloride, 20 c.c. of M lactate, 355 c.c. of water, and enough glucose (5 per cent) to make 750 c.c., was given in 4 oz. feedings every four hours. Plasma and whole blood were given intravenously on alternate days. On October 12 the abdomen became quite distended and hard. A rectal tube and Pituitrin S brought no relief. On October 16 sulfadiazine was started. By October 21 abdominal distention was so pronounced that respirations became embarrassed. However, the temperature remained normal. On October 22 abdominal distention was tremendous. The child was irritable, respirations were labored, and there was regurgitation of fecal material. An enema returned yellow fecal material, but the distention was not relieved. The temperature was 101° F., pulse 128. Prostigmine was given without relief of distention. A constant rectal tube being ineffectual, a Wangensteen drainage was started. Continuous oxygen was given, but the respirations remained poor and ceased at 8:20 P.M.

Pathologic Report.—On opening the peritoneal cavity, a foul odor was noted. The loops of the bowel were matted together by lacy adhesions. Approximately 200 c.c. of yellow fluid was present. The bowel was markedly distended. The bowel wall appeared shiny. Strands

congenital heart patients with septal defect, and that this should always be borne in mind in attending these patients. The explanation of this was followed by expressions of surprise on the faces of some members of the Section.

The next time that my attention was forcibly drawn to this subject was a year ago when my son showed me in one of his surgical journals an abstract of a very important article by Stanley L. Robbins (Arch. Int. Med. 75: 279, 1945) who added three cases to the twenty-three mentioned in R. Hanna's paper,*



Fig. 2.—Case 2. Abscess in right occipital lobe drained, recovery following; six weeks after operation, symptoms of recurrence, exploration at site of operation negative, lumbar puncture showing general meningitis; autopsy showed large encapsulated abscess in right temporal lobe.

seventeen of them from the literature and six of Hanna's own. Dr. Robbins could find only three patients in which the abscess had been diagnosed during life and operated upon, one patient recovering. His comments are so pertinent and valuable that I quote them rather freely: "Brain abscess is a relatively unrecognized complication of congenital heart disease, so little known that only rarely does one find reference to it in any standard textbook of medicine. . . . In all probability, this apparent obscurity and paucity of reported cases represent the failure either of their recognition or of their publication rather than the rarity of their occurrence. . . . With the increased number of cases reported it is to be hoped that in patients with congenital heart disease, especially in those having the tetralogy of Fallot, underlying brain abscess will be considered in

*Am. J. Dis. Child. 62: 553, 1941.

plastic and difficult to differentiate. The mesenteric lymph nodes were edematous and infiltrated with polymorphonuclears. These showed no evidence of necrosis.

CASE 3.—This 17 day old infant was admitted to Harriet Lane Home of the Johns Hopkins Hospital on October 30, 1946, because of diarrhea.

The baby was born at Provident Hospital, October 13, 1946, with a birth weight of 5 lb., 3 oz. The mother had pre eclampsia, and labor was induced at thirty one weeks. The baby was placed in an incubator and was given oxygen, as necessary, for listlessness and rapid respirations. Feedings consisted of Olac every three hours, but these were taken poorly and the baby steadily lost weight. On October 20, the infant developed thrush, and was treated with 1 per cent gentian violet. The baby began vomiting two days before admission and received 40 c.c. of 2½ per cent glucose daily because of this. At the time of admission, a loose, green, watery stool was noted. This apparently had not been present before. The temperature was 99.3° F., the pulse 90, respirations 28, and the weight 3 lb., 9 oz.

Physical examination revealed a markedly dehydrated, scrawny little infant who resembled a shrivelled premature. The skin was wrinkled and dry with turgor. The anterior fontanelle was slightly depressed. The buttocks were excoriated. The cry was hearty and the baby was alert. Physical examination was otherwise entirely negative.

Laboratory Results.—On October 30 the urine was cloudy, yellow, negative for albumin, and showed a one plus sugar without acetone; microscopic examination was negative. A blood study on October 30 revealed a hemoglobin of 22 Gm. The erythrocyte count was 5.25, leucocyte count 16,650, with a differential count of stab cells, 14; segmented cells, 24; lymphocytes, 51; and monocytes, 8. The red blood cells were hyperchromatic. On November 1, the hemoglobin was 22.5 Gm. The serologic test for syphilis was negative. On October 30 a stool culture showed a growth of pseudopyocyaneus.

After admission the infant continued to have watery, greenish-white stools. Thirty cubic centimeters of plasma were given intravenously and glucose and normal saline were given subcutaneously. Caffeine and sodium benzoate and adrenalin were given as needed. The infant was placed in an incubator and nothing was given by mouth. Fifty milligrams of ascorbic acid were given every day. On October 31 the temperature fell to 97° F. The child continued to have six to eight watery green stools every day. Repeated intravenous infusions of plasma and subcutaneous infusions of saline and glucose were given. On November 2 the infant was given 20 c.c. of glucose by mouth every three hours. By November 5 the stools appeared more formed and the child had only two on this day. The infant showed a constant weight gain, and on November 5 he weighed 4 lb. 5 oz. Ten cubic centimeters of skimmed milk were given every three hours.

On November 6 the temperature was elevated to 100.4° F. The infant regurgitated and became cyanotic, with shallow and irregular respirations. Many coarse râles were heard throughout the chest. During the day he had several bloody diarrheal stools and the abdomen became distended. Penicillin, 10,000 units, was started every three hours, but the infant was discovered dead with tremendous distention at 5:43 P.M.

Pathologic Report.—The abdomen contained 100 c.c. of cloudy, yellowish fluid. There was thick, purulent material over the bowel on the entire right side and in the pelvis, with adhesions of the bowel in this region. The arrangement of the organs was normal except that the appendix was plastered to the anterior rectal wall in the pelvis. Many loops of bowel showed small, hemorrhagic, and purulent areas on the serosa.

The jejunum appeared normal except for mild distention. The serosal surface of the lower ileum showed scattered areas of what appeared to be superficial abscesses surrounded by a hemorrhagic zone. In some areas these formed confluent masses measuring about 2.5 cm. in length. In the terminal ileum just at the ileocecal valve, the wall was thickened and hemorrhagic and in the mucosa there was a definite irregular, purulent ulcer. The appendix, as previously stated, was found in the pelvis, surrounded by purulent material. On removal from the body, the appendix was seen to be perforated in three different places. The tip of the appendix was gone, with the end open to the peritoneal cavity and the margin of the opening covered with purulent material. Two other perforations were apparently due to purulent

encapsulated and filling the whole right temporal lobe. Also of interest in relation to the cardiac defects was a transposition of the viscera, recognized by radiology (Fig. 3) during life, the liver dome being on the left, the heart mainly on the right, autopsy showing the stomach, pancreas, and spleen on the right. The right ventricle and auricle were greatly hypertrophied while the left were so atrophic as to make the heart practically bilocular.

Another case in which the diagnosis of cerebral abscess was made during life with operation and recovery has been reported by one of our fellow members, Dr. Russell J. Blattner, in association with Drs. Edmund A. Smolik and Florence M. Heys* and this with the two added here gives a total of six operations with two recoveries.

Another case suspected but operation not permitted was observed by Commander Stanley S. Sidenberg, Lieutenant Colonel M. W. Kessler, and Major H. Wolpaw† in a boy 6 years old with a pulmonic systolic murmur, cyanosis, clubbing of fingertips, cardiac area not enlarged, and severe attacks of pain around the heart relieved by oxygen inhalations; a severe headache was followed two weeks later by sudden rise in temperature to 103° F. meningeal cry, rigid neck, spasticity of the right arm and leg, and death the next day. Examination post mortem showed many congenital anomalies, the main ones being Fallot's tetralogy and absence of the cerebellar vermis, with an abscess of the left parietal region, cultures giving *Staphylococcus aureus, Bacillus pyocyaneus* and *Bacillus coli.*

Since the reading of this paper, personal communications from two fellow practitioners, each having seen an unreported case (no operation during life) bring the total to thirty-six cases.

CONCLUSIONS

1. Reports of a total of thirty-six cases of congenital heart disease with abscess of the brain, found, without an exhaustive search, in the literature, when compared with the rather infrequent occurrence of congenital heart lesions in the average run of medical practice, justifies the belief that these patients, as a class, have greater susceptibility to this complication than all the other medical groups of children, even those with otitis or with acquired heart lesions.

2. Undoubtedly many cases are either unrecognized or unreported.

3. This susceptibility should receive greater attention in textbooks and in courses in the medical schools, especially in pediatrics, internal medicine, neurology, and surgery.

4. The parents and other caretakers of these patients should be told of this susceptibility and advised to watch in any acute illness for unusual symptoms that might be referred to the nervous system, such as facial neuralgia, or complaints of pain in any particular spot in addition to the ears, severe headache, general or localized, apparently causeless vomiting, muscular twitchings or loss of power, especially if of one side, and disturbances of vision.

*J. A. M. A. 130: 145-7, 1946.
†J. Pediat. 28: 719, 1946.

produced stomatitis and diarrhea in children. In the newborn infant diarrhea was the predominating feature. Light and Hodes[16] isolated a filterable virus from stools of infants with neonatal diarrhea which produced diarrhea in calves.

The clinical course of each of our infants was not unlike that seen in the uncomplicated cases of neonatal diarrhea. Loose, greenish white, foul smelling, watery stools, often passed with considerable force, was the presenting complaint in each instance. Dehydration and acidosis were constant findings. The only aspects of the course of these infants that differed from those in the typical cases were the marked abdominal distention leading to respiratory embarrassment seen in the terminal stages, and a rising temperature with little response to chemotherapy. Regurgitation with an increasing degree of acidosis was a common terminal finding. Rigidity and muscular spasm were not evident. The stools showed no appreciable change after perforation, and blood was found microscopically in only one case.

It is apparent that minor differences encountered were due to the perforation and subsequent peritonitis. To our knowledge only one other case of peritonitis associated with neonatal diarrhea has been reported and that was described by Kimberly.[14] In his series of six cases there was no ulceration and the pathogenesis of the peritonitis was unexplained. Abt,[1] has summarized the causes of fetal peritonitis, but he does not include ulceration accompanying diarrhea as a common cause. The etiologic factors which he stresses are: transmission of organism from the mother, syphillis, spontaneous rupture during fetal life, urinary tract malformations, gastrointestinal tract abnormalities, fetal appendicitis, bands and adhesions causing intestinal obstruction, and abnormalities of the biliary tract. Bullowa and Brennan,[5] in 1919, first reported perforation due to a meconium plug causing intestinal obstruction. Since that time there have been other reports[2] of peritonitis because of this mechanism. Peptic ulcers have been described in children and infants. Donovan and Santulli[10] reported a series of ten cases of peptic ulcer in children, but the youngest was in a 4-month-old infant and perforation did not occur in any of the cases. Bird, Limper, and Mayer,[3] in a review of the literature, summarized 245 cases of peptic ulcer in infants and children. Thirty-eight of these cases were in the newborn infant (1 to 14 days) with twenty-six duodenal and two gastric ulcerations. Eighteen of these perforated. Morrison[19] has reported an interesting type of ulceration in older children with malignant hypertension and uremia, but this has not been described in the newborn infant.

There seems to be little to offer these infants so far as therapy is concerned. A general regime aimed at combating dehydration, acidosis, and anemia is surely in order. Preventive measures are paramount in view of the absence of specific forms of therapy. Lembeke and associates[15] concluded that breast-fed babies were less prone to have neonatal diarrhea than those babies artificially fed. Their conclusions were based on two epidemics studied in Rochester, N. Y. Souther[21] has emphasized the importance of isolation precautions and Carson[6] has summarized the recent ideas concerning therapy in diarrhea of infants.

PERITONITIS ASSOCIATED WITH NEONATAL DIARRHEA

JOHN P. DOENGES, M.D.
BALTIMORE, MD.

THE three cases included in this paper present an unusual complication in a disease which commonly follows a quite characteristic pattern. Though neonatal diarrhea uniformly carries a grave prognosis, peritonitis secondary to rupture of an ulceration of the small bowel is rare in the experience of the staff of this hospital.

Two of the cases presented occurred during an epidemic of neonatal diarrhea. Seven infants between the ages of 1 and 10 weeks were involved in the epidemic. The clinical picture was similar in every case except for the terminal stages of two cases discussed in detail later in this paper. With each infant the stools were liquid, whitish green, foul smelling, and passed projectilely. Dehydration and acidosis closely paralleled the number and character of the bowel movements. Three of the infants recovered after intensive therapy. Four succumbed, and autopsies were performed in all of these cases. Two of these patients presented the typical post-mortem findings of dehydration, acidosis, and marasmus, and the other two deaths were due to peritonitis.

The third case presented in this paper was seen at Harriet Lane Home of the Johns Hopkins Hospital, and the clinical and pathologic findings were so similar to our cases that we have requested permission to include a brief abstract of it in our series. The case reports and pathologic findings in the three cases are as follows:

CASE 1.—A 3-week-old infant was admitted to the pediatric service Sept. 26, 1946, with the complaint of diarrhea of four days' duration.

This infant, born by cesarean section, Sept. 4, 1946, had a birth weight of 4 lb., 10 oz. Five days post partum she developed an impetigo over the groin, face, neck, and around the ears. Penicillin was given intramuscularly in doses of 3,000 units every three hours and penicillin ointment was applied locally to the lesions. A formula of Olac and water was started. The baby took this satisfactorily and improved rapidly. Weight on September 20, at time of discharge, was 5 lb., 10 ounces.

On September 22, the infant began to have diarrhea with several loose, greenish, squirting bowel movements. The formula was changed by the attending physician to boiled skimmed milk and water. The following day the stools became yellow in color, but remained liquid and became more frequent, so that the infant was having a movement every hour. Hospitalization was then advised.

Physical examination revealed a well-developed, white female infant, who apparently had recently lost weight. The infant was irritable and cried constantly. There was a diffuse, reddish, maculopapular rash, occasionally topped with a vesicle, over the face, neck, and chest. The skin was otherwise of normal color and texture. The fontanella were not depressed. Physical examination was otherwise negative. The temperature was 101°F.

From the Department of Pediatrics, Mercy Hospital Division of the University of Maryland School of Medicine.

4. Buddingh, G. J., and Dodd, K.: J. PEDIAT. 25: 105, 1944.
5. Bullowa, J., and Brennan, R.: J. A. M. A. 73: 1882, 1919.
6. Carson, M. J., and Carol, N.: Med. Jour. 6: 323, 1945.
7. Colvin, S. H., and Emory M.: New Orleans Med. and Surg. J. 94: 73, 1941.
8. Crowley, C. N., Downie, A. W., Fulton, F., and Wilson, G. S.: Lancet 2: 590, 1941.
9. Dick, G. F., and Dick, G. H.: Am. J. Dis. Child. 35: 955, 1928.
10. Donovan, E. J., Santulli, T. V.: Am. J. Dis. Child. 69: 176, 1945.
11. Felson, J., and Wolarski, W.: Arch. Pediat. 59: 495, 1942.
12. Greenberg, M., and Wronker, B. S.: J. A. M. A. 110: 563, 1938.
13. Hormaeche, E., Surraco, N. L., Peluffo, C. A., and Aleppo, P. L.: Am. J. Dis. Child. 66: 539, 1943.
14. Kimberly, A. M.: New Eng. J. Med. 220: 664, 1939.
15. Lembcke, P. A., Quinlivan, J. J., and Orchard, N. G.: Am. J. Pub. Health 33: 1263, 1943.
16. Light, J. S., Hodges, H. L.: Am. J. Pub. Health 33: 1451, 1943.
17. Lyons, G. M., and Folsom, T. G.: Am. J. Dis. Child. 61: 427, 1941.
18. McClure, W. B.: J. PEDIAT. 22: 60, 1943.
19. Morrison, J. E.: Arch. Dis. Child. 20: 90, 1945.
20. Neter, E. R., & Farrar, R. H.: Am. J. Digest. Dis. 10: 344, 1943.
21. Souther, S. P.: Ohio State M. J. 39: 30, 1943.

friable and necrosed in appearance. No free perforation was seen and no attempt was made to explore this area with an instrument for fear of creating one. None of the intestinal contents could be expressed from this necrosed area.

Microscopic Report.—The peritoneum had a very loose, edematous texture. There was an infiltration with polymorphonuclear cells, but no fibrin or exudate was encountered. The mucosa was uniformly and generally infiltrated with polymorphonuclear cells. Large areas showed necrosis of the mucosa. The infiltration was also seen in the submucosa and extended into the muscular wall. There were patches of fibrinous exudate on the serosal surface. There were no lymph follicles. Through the entire wall at one point extended a pool of polymorphonuclear cells. The muscle fibers were necrotic and the area suggested a point of perforation.



Fig. 1.—Photomicrograph through the ulceration described in the jejunum. Necrosis of the mucosa and submucosa with erosion is evident; there is marked cellular infiltration of the remaining strands of the muscularis (Case 1).

CASE 2.—A 3-week-old white male was admitted to the pediatric service on Sept. 22, 1946, with a complaint of diarrhea of four days' duration and a boil on the right buttock of two days' duration.

The child had been delivered normally at full term with low forceps. The hospital postpartum course had been uneventful and he was duly discharged. No details are recorded concerning the feeding of the child.

DISCUSSION

This syndrome was first described in 1896 by Marfan. There are various theories as to the etiology, none of which are proved or accepted. The most tenable is that the condition results from a fault in the mesodermal cells of the embryo. About one third of the reported cases are hereditary and familial, the affection being transmitted by either sex through two or three generations, with about 50 per cent of the offspring affected. Marfan considered the deformities as possibly a result of trophic alterations of neuropathic origin but also mentioned the possibility of an endocrine pathogenesis similar to that of acromegaly.

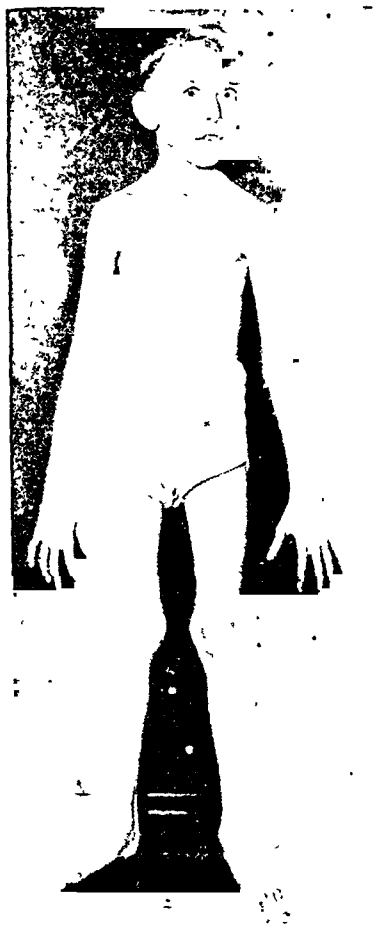


Fig. 1.—Elongation of the hands and feet in a boy aged 6 years with arachnodactylia.

Clinically the syndrome of arachnodactyly seems to be closely allied to amyotonia congenita. There is marked atrophy of the entire musculature, especially in the extremities. Laxity of the ligaments and a resulting abnormal motility of the joints is a usual feature of the condition. The subcutaneous fat is diminished in amount. The bones of the hands and feet are relatively and absolutely increased in length, especially the metacarpals, metatarsals, and

of fibrin were seen scattered over the intestinal wall. In the region of the cecum there was a walled-off pocket containing pus and fecal material. The walls were thin and ruptured easily. This abscess was approximately 2½ cm. in diameter. Between the loops of the small intestine there was a 2 cm. pocket of amber-colored fluid. The wall of this cyst was very thin and friable. There was marked lymphadenopathy of the mesenteric glands. The glands were firm, averaging ½ to 1 cm. in diameter and matted together. The omentum was included in the matting of the intestines.



Fig. 2.—A specimen from the ileum showing numerous small ulcerations. The arrows indicate points of perforation (Case 2).

The stomach was distended. The mucosal pattern appeared normal. There were five small petechial hemorrhages on the mucosal surface of the greater curvature. The pylorus appeared normal. Throughout the entire small intestine there were multiple ulcerations measuring 1 mm. to 8 mm. in diameter. Each ulcer was surrounded by an area of induration measuring 1 mm. in width. On the serosal side of the bowel there was an area of hyperemia corresponding to each ulcer. Peyer's patches were enlarged and hyperemic. Two inches above the ileocecal valve there was an ulcer measuring 1½ cm. in diameter, which opened into the abscess cavity previously described. The entire bowel was very friable and was ruptured frequently during removal. The appendix was normal in size and position. The large bowel appeared entirely normal, showing no evidence of ulceration, hyperemia, or hemorrhage. The intestines contained much yellowish, curdy, fecal material and a moderate amount of mucus.

Microscopic Notes.—The entire thickness of the wall was diffusely infiltrated with polymorphonuclear cells, among which large macrophages were seen. There was also marked edema. The mucosa presented areas of interruption not typical of ulcers. These were merely segments of missing mucosa. There was not the usual granulation and fibrin surrounding these ulcerlike areas. The submucosa and wall of the bowel were infiltrated with leucocytes to the same degree as in the sections where the mucosa was intact. There was no evidence of coagulation or the development of a diphtheritic membrane. The peritoneal surface was covered with a fibrinous or purulent exudate. The Peyer's patches and solitary follicles were hypo-

phalanges. All the long bones of the body have a tendency to be increased in length. This lengthening becomes more pronounced toward the distal end of the limbs.

Abnormalities of the skull, usually toward dolichocephaly, are present in about 80 per cent of the cases. Prominent supraorbital ridges, frontal bosses, and prognathism are common. The palate is often narrow and highly arched.

Bilateral abnormalities of the eyes occur in over half the cases. Luxation or subluxation of the lens is the most frequent abnormality. Small pupils, tremulousness of the iris (irododonesis), strabismus, transient nystagmus, and a high degree of myopia are common. The fundus is usually normal.

Congenital heart disease has been noted in about a third of the cases. Perforate ventricular septum, patent ductus arteriosus, patent foramen ovale, and patent interauricular septum are among the lesions described.

Bodily proportions of the arachnodactylic child closely simulate pituitary gigantism as seen before puberty. The span is greater than the height, along with an increased height for the age. In pituitary gigantism, however, the bone age is usually retarded while in the former the bone age is increased by at least two years. Affected children are usually taller but weigh less than normal children of the same age. As a rule the mentality is excellent.

There is no satisfactory treatment. These individuals should lead a moderate sheltered life with a ban on strenuous physical exertion. There is a low resistance to respiratory infections and as a result few children with this disorder reach maturity. The majority have died of pneumonia.

The diagnosis can be established in the majority of cases by a casual survey of the patient as he enters the office, provided the physician is aware of the essential features of this syndrome.

CONCLUSIONS

A case of arachnodactylia in a 6-year-old male child is presented. The prominent features of this typical case were elongation of the feet and hands, muscular atrophy, and iridodonesis.

REFERENCES

1. Rados, A.: Arch. Opth. 27: 477, 1942.
2. Baer, R. W.: Brennemann's Practice of Pediatrics IV: 26, Hagerstown, Md., 1938, W. F. Prior Co.
3. Young, M. L.: Arch. Dis. Child. 4: 190, 1929.
4. Schneider, W. F.: J. PEDIAT. 27: 583, 1945.
5. Dvorak-Theobald, G.: Am. J. Opth. 24: 1132, 1941.
6. Gray, H.: Arch. Int. Med. 75: 215, 1945.
7. Olcott, C. T.: Am. J. Dis. Child. 60: 660, 1940.
8. Ellis, R. W.: Arch. Dis. Child. 15: 267, 1940.

of fibrin were seen scattered over the intestinal wall. In the region of the cecum there was a walled-off pocket containing pus and fecal material. The walls were thin and ruptured easily. This abscess was approximately 2½ cm. in diameter. Between the loops of the small intestine there was a 2 cm. pocket of amber-colored fluid. The wall of this cyst was very thin and friable. There was marked lymphadenopathy of the mesenteric glands. The glands were firm, averaging ½ to 1 cm. in diameter and matted together. The omentum was included in the matting of the intestines.

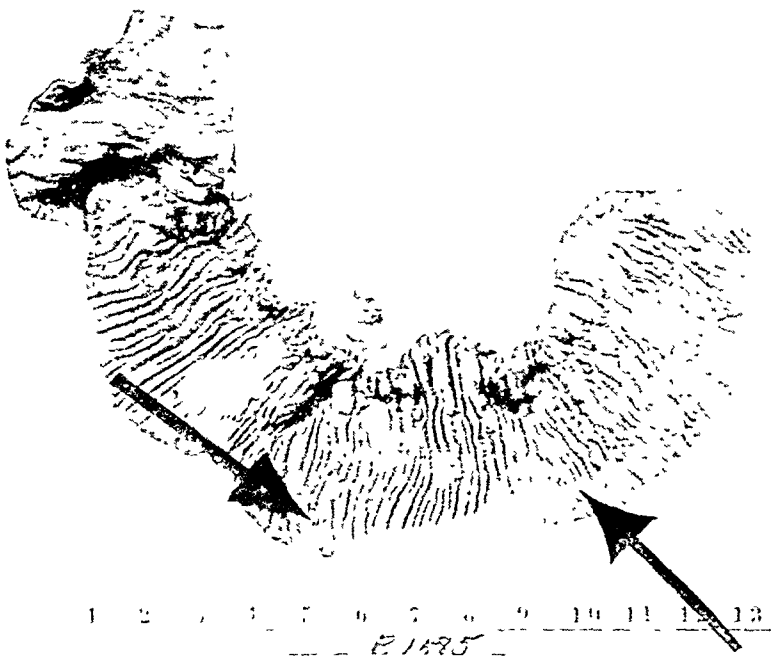


Fig. 2.—A specimen from the ileum showing numerous small ulcerations. The arrows indicate points of perforation (Case 2).

The stomach was distended. The mucosal pattern appeared normal. There were five small petechial hemorrhages on the mucosal surface of the greater curvature. The pylorus appeared normal. Throughout the entire small intestine there were multiple ulcerations measuring 1 mm. to 8 mm. in diameter. Each ulcer was surrounded by an area of induration measuring 1 mm. in width. On the serosal side of the bowel there was an area of hyperemia corresponding to each ulcer. Peyer's patches were enlarged and hyperemic. Two inches above the ileocecal valve there was an ulcer measuring 1½ cm. in diameter, which opened into the abscess cavity previously described. The entire bowel was very friable and was ruptured frequently during removal. The appendix was normal in size and position. The large bowel appeared entirely normal, showing no evidence of ulceration, hyperemia, or hemorrhage. The intestines contained much yellowish, curdy, fecal material and a moderate amount of mucus.

Microscopic Notes.—The entire thickness of the wall was diffusely infiltrated with polymorphonuclear cells, among which large macrophages were seen. There was also marked edema. The mucosa presented areas of interruption not typical of ulcers. These were merely segments of missing mucosa. There was not the usual granulation and fibrin surrounding these ulcerlike areas. The submucosa and wall of the bowel were infiltrated with leucocytes to the same degree as in the sections where the mucosa was intact. There was no evidence of coagulation or the development of a diphtheritic membrane. The peritoneal surface was covered with a fibrinous or purulent exudate. The Peyer's patches and solitary follicles were hypo-

Eight months later the tier had fallen to 1:500. The most recent report published by Gruber and associates,[17] which, although a bona fide case of Group B isoimmunization, is not the first case to be so reported in the light of the foregoing discussion.

We wish to report another case of Group B isoimmunization.

On Feb. 12, 1947, M. C., a 6 lb. 15 oz. Negro male child was delivered spontaneously at Harlem Hospital. The mother was gravida ii, para ii. The first pregnancy terminated spontaneously at term. The mother never had any transfusions and her blood Kahn reaction was negative.

The baby at birth presented no clinical abnormalities. However, an icteric tinge was noted on the second day of life. The jaundice began to deepen quickly, so that by the third day the baby's skin and mucous membranes were obviously yellow. The physical examination at this time was essentially negative except for a barely palpable liver. The spleen was not palpable. No dehydration was present. The blood findings on the third day showed a moderately severe anemia but the infant did not appear critically ill (Table I).

TABLE I

DAY OF LIFE	% HEMOGLOBIN (SAHLI)	ERYTHROCYTES (MILLIONS)	% HEMATOCRIT	NUCLEATED ERYTHROCYTES PER 100 LEUCOCYTES
3	68	2.3	35	3
4	58	4.2	20	15
6	56	3.3	28	12
11	75	3.9	36	4

The mother was typed as Group O Rh-positive and the baby was found to be Group B Rh-positive. The following day (fourth) the liver was palpable 1.5 cm. below the costal margin. The hemoglobin and the red cell count showed a precipitous fall (Table I). An immediate transfusion of 50 c.c. Group B Rh-positive blood was given intratibially. Other blood findings were:

Icteric index		100
Leucocytes		9,800
Diff.:	Myelocytes	1%
	Premyelocytes	4%
	Metamyelocytes	3%
	"Stabs"	3%
	Polynuclears	68%
	Monocytes	5%
	Lymphocytes	16%

The smear showed marked poikilocytosis and anisocytosis.

Recovery took place at a satisfactory rate. The jaundice diminished while the hemoglobin and erythrocyte counts increased. On the sixth day the liver was no longer palpable. On the eleventh day the mother took the baby home. The hemogram (Table I) on discharge still gave evidence of a moderate anemia, but the general condition of the infant was such that we permitted the discharge. During the entire course of his illness, the baby was afebrile and had normal yellow stools. The baby's blood Kahn was negative.

We requested Dr. N. Rosenthal to make a more complete blood study to determine, if possible, the causes of the hemolytic anemia. The following results were obtained (Table II).

No atypical agglutinins were found. However, the mother had an anti-B agglutinin titer of 1:2,048.

erosion in an inflamed appendix. The colon showed scattered serosal lesions in the ascending portion similar to those seen on the small bowel. In addition, there were seen numerous, scattered, small white nodules beneath the mucosa. There was no ulceration over these areas and they may represent abscesses in lymphoid follicles. The rectum was covered with purulent material and its mucosa was hemorrhagic and also appeared to be ulcerated. The mesentery was thick with lymph nodes.

Microscopic Report.—One section taken through the tip of the appendix showed almost complete necrosis. It was not possible to say whether there had been ulceration here, although some inflammatory exudate could be seen in the wall and serosal surface in parts of the section.

Another section showed three pieces of tissue taken through the appendix; the spaces between each piece represented the sites of perforation seen grossly. There were ulceration and marked necrosis with little inflammation of the wall, and the smallest piece of tissue seen here was made up of ulcerated wall with some exudate on all surfaces. Gram stains showed predominantly gram-negative rods with some gram-positive cocci and rods which appeared to be spore bearers.

Sections of the small intestine showed some inflammatory exudate on the serosal surface with necrosis. The wall of the intestine was involved in some places as deeply as the submucosa. Hemorrhage and necrosis were present at these sites. In a section taken through the ileum and ileocecal valve, there were ulceration and necrosis of the mucosa with some acute purulent exudate on the surface and in the wall.

A section through the terminal colon and rectum also showed ulceration of the mucosa with necrosis penetrating down into the muscularis. A good deal of necrosis was present surrounding and within the ulcerated sites.

One of the mesenteric nodes showed a central focal necrosis in which many bacteria could be seen. Few inflammatory cells were present, and the area was surrounded by many congested vessels.

DISCUSSION

It seems apparent from a study of these cases that a bizarre complication to the typical neonatal diarrhea has been encountered. In the two cases seen at this hospital *Bacillus coli* was found in the stool cultures. The role of this organism has been studied by McClure,[18] who concluded that the hemolytic colon and paracolon organisms were more prevalent in the stools of infants with diarrhea than of infants having normal stools. Numerous other organisms have at various times been ascribed an etiologic role in neonatal diarrhea. Hormaeche and associates,[13] in a large series of cases in Uruguay, found that 57 per cent of all enteritis in children under one year of age was due to the Salmonella or Shigella group of organisms. However, in 680 cases in which positive cultures were obtained, only 98 could fit the clinical picture which we encountered, and all of these occurred sporadically. Neter and Farrar[20] described twelve cases in which *Bacillus proteus* or *Bacillus morganii* or both were discovered in the stools; however, in no instance did agglutinins develop against the homologous micro-organisms. *Staphylococcus aureus hemolyticus* was found in the stools of three cases by Felson and Walorski.[11] They concluded that neonatal diarrhea was a local reaction to an extra-enteric infection. In support of this, Dick and associates,[9] have discussed an epidemic of diarrhea in children associated with mastoiditis. In 1941, Lyons and Folsom,[17] described three epidemics seen at the time of an influenza epidemic in the community. The infants involved were apparently helped by convalescent serum of patients having influenza. More recently, Buddingh and Dodd[4] have isolated a virus which

11. Weiner, A. S.: Pathogenesis of Congenital Hemolytic Disease, Am. J. Dis. Child. 7: 14, 1946.
12. Hallwright, W. W.: Hemolytic Disease of Newborn, New Zealand M. J. 45: 2, 1946.
13. Weiner, A., Oremland, B., Hyman, M., and Samwick, A.: Transfusion Reactions, Am. J. Clin. Path. 11: 116, 1941.
14. Tovey, G. H.: A Study of the Protective Factors in Heterospecific Blood Group Pregnancy and Their Role in the Prevention of Hemolytic Disease of Newborn, J. Path. Bact. 57: 295, 1945.
15. Austin, A. B.: Heterospecific Pregnancy as a Positive Cause of Erythroblastosis Fetalis, Brit. M. J. 2: 123, 1946.
16. Boorman, K. E., Dodd, B. E., and Mollison, P. L.: Incidence of Hemolytic Disease of Fetus in Different Families, J. Obstet. Gynec. Brit. Emp. 51: 1, 1944.
17. Gruber, S., Litvak, A., and Jacobi, M.: A Case of Erythroblastosis Fetalis Caused by Isoimmunization With Agglutinogen B, J. Pediat. 29: 518, 1946.

The latter stresses the importance of maintaining the normal fluid and electrolytic balance and of replacing the glycogen depleted from the tissues. Specific antibiotics are certainly indicated when the organism can be identified. Surgical intervention is undoubtedly futile in view of the multiplicity of lesions. However, Agerty and co-workers[2] have reported recovery of a case of peritonitis probably due to a meconium plug following surgical intervention. The general condition of the infant when such a complication ensues also often mediates against any operative procedures.

Gross inspection of the bowel in these cases revealed a similar picture. In two of the three cases the ulcerations were multiple. In all of the cases the small bowel was involved; however, in the last case described, the appendix seemed to be the primary source of pathologic lesions. The ulcers were not typical in their microscopic appearance. Hyperemia and infiltration with polymorphonuclear cells and central necrosis would indicate an acute process. More widespread loss of mucosa than of the underlying layers was evident, so that it would seem that the etiologic agent gained access from the lumen of the bowel. The pathologic picture seen here was unlike that described by other investigators only because of the presence of ulceration. Golvin and Emory[7] described superficial erosion of the mucosa of the jejunum and ileum with surrounding hyperemia. The typical findings of edema and hyperemia of the bowel wall with mild leucocytic infiltration have been described by Kimberly[14] and Greenberg and Wronker.[12] The microscopic picture observed in our cases did little to define the etiologic agent, and the exact pathogenesis of the ulceration, therefore, is undetermined.

SUMMARY

1. Three cases of nonspecific ulceration of the small bowel with peritonitis complicating neonatal diarrhea have been reported.

2. The clinical picture when such a complication occurs is characterized by abdominal distention, rising temperature, regurgitation, and an increase in the degree of acidosis.

3. The known therapy did not appreciably alter the course of the disease in these cases.

4. The etiology of neonatal diarrhea has been discussed.

5. The pathologic picture in these cases was that of multiple ulceration of the small bowel with perforation and peritonitis.

6. Causes of ulceration and peritonitis in the newborn infant have been briefly reviewed.

I should like to thank Dr. Francis F. Schwentker, Dr. Edgar B. Friedenwald, and Dr. Frederick B. Smith for their many helpful suggestions in preparing this paper. In addition, I should like to thank Dr. Schwentker for his kind permission to include the case seen at the Harriet Lane Home of the Johns Hopkins Hospital.

REFERENCES

1. Abt, I. A.: Med. Clin. North America 15: 611, 1931.
2. Agerty, H. A., Ziserman, A. J., and Shollenberger, C. L.: J. PEDIAT. 22: 233, 1943.
3. Bird, C. E., Limper, M. A., Mayer, J. M.: Ann. Surg. 114: 526, 1941.

being stable in body fluids, and can be taken orally in doses of 0.2 to 2.0 mg. b.i.d. Various amounts can be tolerated. It is used in such conditions as urinary retention, peripheral vascular disease,[15] increased ocular tension, and myasthenia gravis.

Single case reports do not establish the value of a drug, but they do serve to stimulate studies on larger groups. The rarity of congenital megacolon (varying from 1:9,000 to 1:30,000 hospital admissions[3] alone justifies the presentation of single case studies. Furthermore, the value of this report is enhanced by three sets of control periods; namely, one without any medication, one under medication with several of the recommended drugs, and one during the administration of carbaminoylcholine. These considerations, in addition to the all-important fact that medical treatment is a necessity during infancy, warrant the presentation of a single case, in which treatment with doryl has been more successful than with any other medicament.

R. K., a white male child, was born Nov. 12, 1944. Delivery was normal and the newborn period was uneventful except for a mild attack of diarrhea that responded to modification of formula. Family history is noncontributory; he has a normal sister born in 1941. He weighed 8 lbs., 8 oz. at birth, and was placed on an evaporated milk formula. Nothing unusual was noted about his bowel movements, until he was one month of age, when he had not moved his bowels for five days. From then on he was always constipated. Examinations did not reveal any anal or rectal obstruction. He became increasingly distended despite the use of prune juice, magnesia magma, and increase of sugar in the formula. Enemas were often necessary.

At the age of 3 months, the protuberance of his abdomen was quite marked. At the level of the umbilicus the abdominal circumference was 17 inches; while the circumference of the chest was 15¾ inches. A barium enema on the next day revealed a dolichocolon. He was started on 5.5 mg. syntropan three times a day; this was increased to a dose of 13 mg. five times daily, to no avail. Mineral oil was also given, but enemas were necessary to prevent overdistention. On April 9 when he was 5 months old, neostigmine, in the form of prostigmine bromide, was given orally in the dose of 2 mg., but emesis and severe cramps resulted.

He was then hospitalized at the Babies Hospital, New York, where x-rays revealed a marked dilatation of the entire colon, sparing only the rectum and lower sigmoid. This type of megacolon has the poorest prognosis according to Grimson.[16] In that institution he was treated with urecholine (beta methyl choline urethane),[17] which is a choline derivative having a selective action on the urinary and gastrointestinal systems with fewer side effects than doryl. Two weeks of this therapy resulted in daily bowel movements, but anorexia and emesis developed. Therapy was discontinued, and daily movements continued for the following two to three weeks, only to be followed by severe constipation. On June 13, 1945 (age, 7 months), he was given mecholyl bromide in gradually increasing doses up to 100 mg. twice a day orally for one month without improvement. Instead, he lost weight and developed an anemia (hemoglobin red blood cells 3,400,000) which responded to a transfusion, liver, iron, and vitamins. No further specific therapy was given and efforts were concentrated on improving the poor nutrition. For the next month he would have a bowel movement about every three days, but required enemas to reduce distention. On September 8 (age, 10 months) therapy with urecholine was again resumed. Again his hemoglobin began to drop (64 per cent), and by November 1, it was apparent that there was no response to this drug, in so far as bowel movements were not regular.

Case Reports

ARACHNODACTYLIA

THOMAS O. DORRANCE, M.D.
BLUFFTON, IND.

ARACHNODACTYLIA, or Marfan's syndrome, is characterized by a congenital symmetric malformation of the extremities consisting of considerable elongation and attenuation of the bones, more pronounced in the distal parts. This tendency to "spider hands and feet" is associated with muscular atrophy, and often with ocular and cardiac anomalies.

Andrew Rados, in March, 1942, in an excellent paper, reviewed all the 204 reported cases. Since his publication I have been able to find an additional forty-three cases in the literature, making a total of 247 reported cases up to June, 1946.

REPORT OF CASE

The patient, aged 6 years, was first seen in August, 1946. His symptoms were primarily muscle weakness and fatigue. The height was 52 inches (130 cm.), weight 46 pounds (2.09 kg.) and span 54½ inches (136 cm.). He was obviously tall and slender for his age. The musculature was weak, as evidenced by a stooped posture and forward drooping of the head. No subcutaneous fat was apparent. The eyes were extremely myopic, corrected with lenses to 20/25 vision bilaterally. The irides were tremulous, thin, and devoid of pigment. The lenses were tremulous but otherwise normal and the fundi appeared to be normal. The tonsils were enormously enlarged and there was an adenoid facies. The extremities, especially the hands and feet, were markedly elongated, and slender (Fig. 1). Physical examination was otherwise negative. Blood pressure was 106/80, pulse 90; there was no abnormality of the heart. Reflexes were present and normal.

The laboratory findings were as follows: Urinalysis negative; hemoglobin, 11.4 Gm. (73 per cent); R.B.C. 3,800,000; white count and differential normal; mazzini negative. The blood sugar was 124 mg. per cent.

Roentgenograms of the hands and feet showed pronounced elongation of the digits, (Fig. 2). Those of the urinary tract, chest, and skull were negative.

The past history of this case was not remarkable. He was delivered normally at term, weighing 8¼ pounds at birth. Development was normal with the eruption of the first tooth at 8 months, walking at 9 months and talking at 18 months. He started school at the age of 5 years and when last seen in June, 1947, he had successfully completed the first grade.

The family history was uninformative. There were no siblings. The parents and all the grandparents were normal individuals.

When seen in June, 1947, ten months after the original examination the patient had grown 2½ inches in height. The span measured 57 inches (142 cm.) as compared with 54½ inches (136 cm.) ten months before. He had gained 9 pounds. The tonsils and adenoids had been removed Aug. 20, 1946. The eyes and laboratory findings were the same as on the original observation. The child now wore a 6½ AAAA shoe, the foot measuring 9 inches in length and 2 inches in its widest dimensions, the hand 7 by 2¾ inches.

From the Taylor-Nickel Clinic, Bluffton, Ind.

of writing) of regular bowel movements while taking doryl (except for a one and one-half month control period) stands in sharp contrast to the results of any other medication in this case of congenital megacolon.

I would like to express my appreciation to Miss Carlson, librarian of the American Cyanamid Co., for her assistance.

REFERENCES

1. Herman, L. G.: Surg. Clin. N. A. 1170, 1946.
2. Penick, R. M.: J. A. M. A. 128: 423, 1945.
3. DeTakats, G., and Biggs, A. D.: J. PEDIAT. 13: 819, 1938.
4. Law, J. L.: J. A. M. A. 114: 2537, 1940.
5. Law, J. L.: Am. J. Dis. Child. 60: 269, 1940.
6. Peterman, M. G.: J. PEDIAT. 27: 484, 1945.
7. DeSanctis, A. S., and Larkin, V. DeP.: N. Y. State J. Med. 45: 310, 1945.
8. Klingman, W. O.: J. PEDIAT. 13: 805, 1938.
9. Stebbins, S. I.: Am. J. Surg. 27: 107, 1935.
10. Morton, J. J., and Scott, W. J. M.: Ann. Surg. 92: 919, 1930.
11. Reeves, R. J. and Harrison, E. K.: Radiol. 28: 731, 1937.
12. Sheldon, L., Kern, R. A., and Hakansson, E. G.: Am. J. Med. Sc. 184: 94, 1932.
13. Van Gelderen, C.: Acta chir. Scandinav. 94: 81, 1946.
14. Goodman, L., and Gildman, A.: Pharmacological Basis of Therapeutics, New York, 1941, The Macmillan Co.
15. Starr, I.: Am. J. M. Sc. 193: 393, 1937.
16. Grimson, K. S., Vandegrift, H. N., and Dratz, H. M.: Am. J. Dis. Child. 68: 102, 1944.
17. Starr, I., and Ferguson, L. K.: Am. J. Med. Sc. 200: 372, 1940.

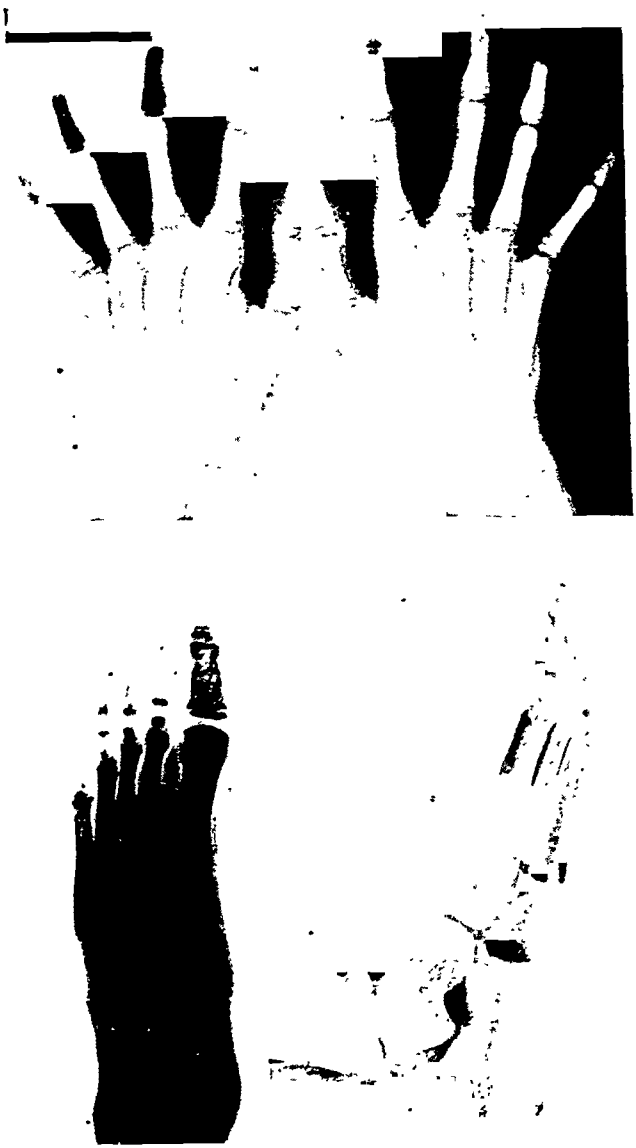


Fig. 2.—Roentgenograms showing marked elongation of the metacarpals, metatarsals, and phalanges.



Fig. 1.—A. T. when 4 months of age, showing: *A*, Absence of left upper extremity and the genu recurvatum; *B*, Developmental abnormalities of the right upper extremity; *C*, Skeletal changes in the right upper extremity and the rudimentary humerus on the left.

CONGENITAL HEMOLYTIC ANEMIA OF THE NEWBORN INFANT CAUSED BY ISOIMMUNIZATION WITH AGGLUTINOGEN B

ABRAHAM NATHAN, M.D., FREDERICK C. GREEN, M.D., AND GEORGE WEISS, M.D.
NEW YORK, N. Y.

IN 1940 Landsteiner and Weiner[1] discovered the Rh antigen. In 1941 Levine and co-workers[2] demonstrated the relationship between Rh incompatibility and erythroblastosis fetalis. Since then, the fields of hematology and pediatrics have been enriched by the voluminous work done in exploring the Rh subgroups and their roles as causative agents of hemolytic anemia of the newborn infant. However, not all cases of erythroblastosis are caused by the Rh antigen-antibody reaction. The A or B agglutinogens, commonly present in many individuals, can, on occasion, cause hemolytic anemia of the newborn with jaundice.

As early as 1905, Dienst[3] suggested that heterospecific pregnancies may give rise to morbid conditions in mother and infant. McQuarrie[3] furthered this theory by showing that toxemias of pregnancy and subsequent infant morbidity increased when an incompatibility existed between the mother's and infant's bloods. Ottenberg[3] and La Vake[4] proposed that a leakage of fetal blood during pregnancy resulted in isoimmunization. Hirzfeld[3] stated succinctly that the fetus could be damaged in heterospecific pregnancies due to the passage of maternal antibodies into the baby's circulatory system.

Johsson[5] and others[6-8, 13] proved that the titer of anti-A or anti-B agglutinins rises during heterospecific pregnancies. Titers of 1:58 anti-A agglutinins were observed in Group O nulliparous women, whereas those Group O women who gave birth to Group A children showed an anti-A titer of 1:215.[7] The literature has no comparable studies for Group O mothers with Group B children. Why the antigens A or B are not responsible for more cases of congenital hemolytic anemia is explained in several ways. The most widely held view maintains that 80 per cent of the population are "secretors" (contain the specific group substances in their tissues and secretions, e.g., saliva) whereas 20 per cent of the population are "nonsecretors."[9] This condition enables the "secretors" to protect themselves from the hemolytic effects of isoimmunization.[9-12] Tovey[14] gives four reasons why the fetus enjoys protection from the mother's agglutinins in heterospecific pregnancies: (1) lack of placental permeability to anti-A or anti-B agglutinins; (2) fetal plasma neutralizes the A or B antibodies; (3) fetal erythrocytes are not sufficiently sensitive; and (4) the A and B antibodies do not react very well at body temperature. Weiner,[11] too, supposes a placental barrier for the anti-A or anti-B isoagglutinins because of their relatively large molecular size.

There are cases on record proving the presence of a hemolytic anemia of the newborn infant resulting from the isoimmunization by the agglutinogen A or its subtype A_1.[7, 9, 15, 16]

The literature concerning Group B isoimmunization is very sparse. In a review of 100 cases of erythroblastosis, Boorman and associates[16] found two cases where the anti-B titer was significantly high to suspect the B agglutinogen as the cause of the anemia. La Vake[4] quotes Koucky who delivered a Group O Rh-positive mother of a Group B Rh-positive baby. The infant became severely jaundiced and anemic. The anti-B titer five weeks post-partum was 1:1,600.

From the service of Dr. Morris Gleich, Director of Pediatrics, Harlem Hospital, New York.

teratologic variations. Experimentally, the developmental rate (probably actually the oxidation rate) could be modified by temperature suppression.

Streeter[3] stressed "the normal disparity in the quality or vitality of different tissues of the body, inherent in the germ-plasm and hereditarily transmitted." Any tissue could evidence an abnormal variation in growth and a hypertrophic or atrophic extremity would strongly reflect the propensity of its anlage for growth. Absence of the primordium would indicate an extreme instance (agenesis). Streeter considered as intermediate in form such structural abnormalities as syndactyly and polydactyly.

Instances of intrauterine amputation would be considered at a level between defective development and true agenesis under this concept and limb bud tissue islands would indicate poor quality for growth. These tissue islands have been noted during the fourth fetal month as degenerated fibrous masses. The amputation stump would be formed by compensatory action of normal adjoining tissues. The so-called amniotic band (adherent hyalinized tissue) would have the same significance as the healed stump or the groove, re-establishment of the equilibrium of tissues by the time of birth.

It is to be noted that as early as 1890, Hirst and Piersol[4] had studied the problem of human monstrosities and concluded that cases of hemimelus (absence or maldevelopment of the distal portion of an extremity), phocomelus (shortening or rudimentary development of an extremity with an essentially normal hand or foot), ectromelus (absence of one or more extremities), and micromelus (morphogenetically normal but small extremity) are to be explained on a basis of arrested development, and this mechanism must be distinguished from intrauterine amputation by amniotic bands.

An interesting and correct case of intrauterine amputation was reported by Latta.[5] His specimens consisted of identical twins which had been still-born. One twin was entirely normal, the other showed absence of the left leg distal to the knee (hemimelus). The stump was covered with skin through which protruded a sharp broken end of fibula. The right ankle appeared to have been involved in a constrictive process with vascular changes distal to the constriction.

Latta justifiably stated that "should these defects have been of such nature as to be hereditarily transmissible, both individuals would have been defective because of their identical inheritance. Secondly, in this one deformed individual are seen, in addition to the amputated leg, what are interpreted as various stages in the process leading to the result."

A case similar to that reported here is the one of Bizzaro[6] who described total absence of the right upper and lower extremities and of the left fibula and fifth toe. At the right hip was a small pedunculated knob which had the appearance of a toe and which was the sole representative of the right lower limb. There was a valgus deformity of the left foot and full passive extension of the left knee was impossible. A radiogram of the shoulder presented a complex of an overdeveloped acromium with complete absence of the glenoid.

The extreme instance of agenesis involving the extremities is the amelus monster which has been reported by Killingsworth and Engledow[7] and by Levy.[8]

The diffuse developmental aberration in the case of A. T. reported here is demonstrated in the absence of one upper extremity and malformations of the other upper extremity. It is quite likely that the deformity of the left knee was not a part of the deficiency process. Chandler[9] has stated that *genu recurvatum* is a minor congenital anomaly when it occurs under such circumstances and is probably due to hyperextension of the knee *in utero*.

Reflecting also the diffuse nature of the disturbance in A. T. were malformations of the ears, jaw, and throat. Furrows were entirely absent on the

About one month later the mother and child returned for a check-up. The baby's growth and development were normal and the baby was in excellent health. The anti-B agglutinin titer of the mother's blood was repeated and found to be 1:256.

The father and other sibling were not available for blood studies.

TABLE II

MOTHER	BABY
Group O	Group B
Rh-	Rh+
Rh' negative	Rh' negative
Rh" negative	Rh" negative
Hr+	Hr+

COMMENT

This is evidently a case of congenital hemolytic anemia which occurred as a result of a heterospecific pregnancy. The baby was not examined to determine whether he was a "secretor" or "nonsecretor." However, we see that the patient's blood was susceptible to the high titer of his mother's agglutinins and subjected to considerable destruction.

A point has been made that it would be wiser to give Group O blood for transfusions in these cases.[17] Group O erythrocytes are not subject to the hemolytic actions of the anti-B agglutinins, and therefore they will more readily preserve the patient's blood level. The patient's recovery will thus be hastened and maintained. We tranfused our case with Group B blood before the true nature of the underlying condition was realized. The results achieved, nevertheless, were good.

SUMMARY

A case of isoimmunization by the agglutinogen B as a result of a heterospecific pregnancy has been discussed in detail. A suggestion that Group O blood be given in similar cases is noted and advised. Included is a complete review of the literature

We wish to thank Dr. Nathan Rosenthal, Attending Hematologist at Harlem Hospital, for his valuable assistance in the blood studies.

REFERENCES

1. Landsteiner, K., and Weiner, A. S.: Studies on an Agglutinogen (Rh) In Human Blood Reacting With Anti Rhesus Sera and With Human Isoantibodies, J. Exper. Med. 74: 309, 1941.
2. Levine, P., Katzin, E. M., and Burnham, L.: Isoimmunization in Pregnancy, J. A. M. A. 116: 825, 1941.
3. Cited from A. S. Weiner: Blood Groups and Transfusions, ed. 3, Springfield, 1943, C. C. Thomas, Chap. XX, p. 328.
4. La Vake, R. T.: Causes of Toxemia of Pregnancy, Lancet 63: 51, 1943.
5. Johsson, B.: Zur Frage Der Heterospezifischen Schwangerschaft, Acta. Path. Micro. Scand. 13: 424, 1943.
6. Smith, G. H.: Iso agglutinin Titers in Heterospecific Pregnancy, J. Path. Bact. 57: 113, 1945.
7. Polayes S. H., and Ohlbaum, C.: Erythroblastosis Fetalis Unrelated to Rh Factor, Am. J. Clin. Path. 15: 467, 1945.
8. Boorman, K. E., Dodd, B. E., and Mollison, P. L.: Isoimmunization to Blood Group Factors A, B, Rh, J Path. Bact. 57: 157, 1945.
9. Polayes, S.: Erythroblastosis in Rh- Mothers, Am. J. Dis. Child. 69: 99, 1945.
10. Halbrecht, I.: Role of Hemoagglutinins Anti A and Anti-B in Pathogenesis of Jaundice of Newborn, Am. J. Dis. Child. 69: 428, 1944.

Clinical Conference

CONFERENCE AT DUKE HOSPITAL

AUG. 28, 1947

Clinic on Nephritis and Nephrosis

DR. R. M. WILHOIT.—M. J., an 8-year-old Negro girl, was brought to Duke Hospital Aug. 22, 1947, with a chief complaint of a poor appetite for five days, unaccompanied by nausea, vomiting or change in bowel habits. For the previous three months she had had sores on her lower legs which had become worse during the three weeks prior to admission. She had not had any upper respiratory infections. Two days prior to admission the patient had swelling of her face, mainly about her eyes, and, on the day of admission, swelling of her ankles. On entry, her temperature was 37.8° C. (100° F.), her pulse rate 68, her respiratory rate 20, and her blood pressure 160/120 bilaterally. Over her lower legs there were many crusted lesions, the majority measuring 1 to 2 cm. in diameter. On removal of the crusts, a small amount of pus could be expressed. There was some pitting edema of the ankles. Examination of the heart, lungs, and abdomen revealed no abnormality. The urine contained 2+ albumin, 15 to 25 red blood cells per high-power field, many white blood cells, and 1 to 2 granular casts. The hemoglobin was 8.5 Gm., R.B.C. 3,500,000 and W.B.C. 9,800 with an increase in neutrophiles. No sickling of the red blood cells occurred. Cultures of the lesions on the legs showed *Streptococcus hemolyticus* and *Staphylococcus aureus*. Blood cultures were negative. The blood nonprotein nitrogen was 108 mg. per cent, the total proteins 7 Gm., albumin 3.4 Gm., globulin 3.6 Gm., and an albumin-globulin ratio of 0.94.

On admission, 10 c.c. sterile 25 per cent magnesium sulfate were injected intramuscularly and repeated in two hours. The patient was placed on complete bed rest, with a salt-free, low protein diet, and 10,000 units penicillin (intramuscularly) given every three hours. For the first six days 30 c.c. of 50 per cent magnesium sulfate also were given every four hours by mouth. Saline compresses were applied to the legs. The blood nonprotein nitrogen rose to 138 mg. per cent the day after admission but fell gradually to 42 mg. per cent by the sixth day. The blood pressure was reduced to 100/70 mm. by the sixth day. On discharge from the hospital on September 1 (eleventh hospital day), the urine contained a trace of albumin, 15 to 25 red blood cells, many white blood cells, and 1 to 2 granular casts.

DR. J. G. ROBBINS.—M. M. N., a 6-year-old Negro boy, was first admitted to Duke Hospital on Aug. 8, 1946, with a history of generalized swelling of four months' duration. The family history was negative. The past history revealed

From the Departments of Pediatrics, Medicine and Pathology, Duke University School of Medicine and Duke Hospital, Durham, N. C.

CARBAMINOYLCHOLINE (DORYL) IN THE TREATMENT OF CONGENITAL MEGACOLON

JACOB GREENBLATT, M.D.
STAMFORD, CONN.

THE therapeutics of congenital megacolon up to the age of 4 years is medical rather than surgical. Such procedures as sympathectomy and colectomy[1-3] are often too dangerous in infancy, and are not completely without danger or so certain of good results that even in older age groups conservative measures should be tried first. In surgically treated patients, drug therapy provides a valuable adjuvant[1] whenever relief is incomplete. Medical management, however, leaves much to be desired, as is evident by the large number and variety of drugs recommended, and from the fact that many cases eventually require surgery. Hence, any promising addition to our medical armamentarium is welcomed in the hope that it may prove superior to any heretofore known drug.

A review of the literature reveals that among the drugs used in megacolon are the choline derivatives (mecholyl bromide, urecholine),[4-6] neostigmine, syntropan,[7] atropine,[8] spinal anesthesia[9] (which is also used as a test to determine the suitability of the bowel for sympathectomy),[10] depropanex,[11] and parathormone.[12] There is no report on the use of carbaminoylcholine in congenital megacolon, except for one by van Gelderen.[13] He employed it hypodermically to determine the advisability of sympathectomy but did not treat his patients with it. This article came to our attention as an abstract in the *Journal of the American Medical Association* (132: 416, 1946) one month after our experiment was begun.

The use of parasympathicomimetic compounds finds its rationale in the theory that Hirschsprung's diseases is a result of a type of imbalance of the sympathetic and parasympathetic nervous systems in which the latter requires stimulation. There are other ideas as to the cause, but they have been adequately discussed elsewhere.[1, 8] Varying amounts of success have attended the use of the compounds enumerated above. Until they were available, there was much less in the way of good results from medical treatment consisting of repeated enemas, liquid petrolatum, laxatives, and anal dilatation. However, the use of frequent enemas (every three days) while there are no bowel movements is not to be belittled in any regime for megacolon therapy. This prevents overdistention and subsequent loss of tone of the large bowel, until such time that the drug or sympathectomy becomes effective. This and supportive treatment with vitamins and adequate diet are important in the care of megacolon. These adjuncts were used throughout the management of the case to be presented, until carbaminoylcholine took effect.

Carbaminoylcholine[14] (carbaminoylcholine chloride, Doryl, Lentin) is a parasympathicomimetic drug distinguished from other choline derivatives by its more powerful action on the urinary bladder and gastrointestinal tract. Its latter characteristic would suggest its use in megacolon. This compound is the most potent and most toxic of the choline series, but the margin of safety is practically that of acetyl B methyl choline. Its action appears more slowly and lasts longer than that of any other choline compound, and atropine is less effective in overcoming the effects of doryl. This drug has the advantage of

4 J's, 4 per cent large lymphocytes, 3 per cent S.L., 6 eosinophiles and 2 monocytes. The urine specific gravity was 1,040, albumin 4+, sugar 0, many white blood cells and hyaline and granular casts, but no red blood cells. The sedimentation rate, corrected, was 34 mm. in one hour. The blood nonprotein nitrogen was 33 mg. per cent; total protein, 4 Gm. per cent; albumin 1.7 Gm. per cent; globulin 2.3 Gm. per cent; albumin-globulin ratio 0.73. The patient was given a diet of dialyzed (sodium-free) milk.

DR. W. C. DAVISON.—The first patient is a typical example of acute glomerular nephritis. This condition represents 57 per cent of the albuminurias in children. It is characterized by hematuria, albuminuria, and cylindruria, with or without edema, hypertension, and increased nonprotein nitrogen. Respiratory infections usually precede the onset, which generally is sudden, but in this patient, as well as in two similar ones now on Howland Ward, impetigo was the precipitating infection. The first symptoms, as in this patient, are anorexia, headache, backache, and drowsiness. Fever, chills, tachycardia, dyspnea, nausea, abdominal pain, and convulsions also may occur.

Treatment.—During excessive albuminuria and hematuria, the patient should be kept in bed. Food and fluid may be reduced for the first two or three days, and if edema is marked, the salt intake should be low. After these signs have diminished, even though they persist, the patient may be allowed restricted exercise. All foci of infections (sinus, etc.) should be sought and treated, but tonsillectomy is inadvisable during albuminuria; it does not prevent nephritis, but may predispose to it. Sulfa therapy may cause improvement in acute nephritis, but as it also may damage the kidneys and cause fatal anuria, it should be used only in small doses with alkalies and forced fluids. Penicillin may be helpful. If blood transfusions are necessary for anemia, they should not be given until the urine is alkalinized by oral sodium bicarbonate or ⅙ molar sodium lactate; they may increase edema. In nephritis of less than four months, the diet should be low in protein without added salt, and in chronic nephritis the diet should contain 3 Gm. protein per kilo of ideal body weight. The usual fluid intake should be maintained. If the blood pressure is over 120 mm. or is rising, and the patient has headache, visual disturbances, coma, or convulsions (pseudo-uremia) in the course of acute glomerular nephritis, 30 to 60 c.c. (oz. i-ii) 50 per cent magnesium sulfate should be given by mouth or rectum and repeated every four hours for two to three days, *or* 5 to 10 c.c. sterile 25 per cent solution (crystalline) (0.5 c.c. per kilo of body weight; 0.2 c.c. per pound) intramuscularly and repeated two hours later if the blood pressure does not fall, *or* 2 per cent solution of the hydrated salt ($MgSO_4 \cdot 7H_2O$) intravenously at the rate of 2 to 3 c.c. per minute, until the blood pressure falls and the coma or convulsions disappear (10 c.c. per kilo of body weight [4 c.c. per pound] may be required). Blood pressure determinations every fifteen minutes are necessary during intravenous magnesium sulfate therapy, which should be stopped when the blood pressure falls. Ten to 20 c.c. of 10 per cent sterile calcium gluconate must be available to treat a sudden fall of blood pressure or pulse. Artificial respiration may be necessary.

His abdomen remained distended when syntropan was tried again on November 13 (age 1 year) in doses of 15 mg. daily. This was increased to 60 mg. in divided doses daily for one and one-half weeks without definite benefit. It was discontinued on December 10, by which time the circumference of his abdomen had increased from 18½ inches to 20½ inches in one month. His bowels were emptied with repeated enemas, and then for a period of two and one-half months he had spontaneous daily bowel movements. However, when he was seen on March 19, 1946, he had had no bowel movements for one week, and his abdomen was becoming distended. Prostigmine bromide was then tried in doses of 2.5 mg. three times a day. There were daily bowel movements for one week, and then this dose had to be given five times daily to produce regular movements. This improvement caused his mother to give the medication irregularly, and at one point (age, 1 year 7 months) she suddenly increased the dose to 2.5 mg. six times daily with emesis and cramps resulting. This was relieved by an injection of atropine gr. 1/500. His bowel movements again became infrequent, and then the dose of neostigmine was gradually increased to 2.5 mg. six times daily but despite the use of this large dose, by July 2 (age, 1 year 8 months) the bowel movements had again become very infrequent.

It was then decided to follow Peterman's[6] treatment schedule using mecholyl bromide 0.05-0.2 Gm. once or twice daily, daily enemas, and mineral oil. In this case the dose of mecholyl was gradually increased to 250 mg. before noon and 200 mg. afternoon, but by August 20, after seven weeks of trial with mecholyl, there was no improvement. In order to potentiate the effects of this drug, it was decided to take advantage of the cholinesterase-inhibiting action of neostigmine, and the latter was added to mecholyl. Neostigmine was given in doses of 5 mg. in the morning and 2.5 mg. in the afternoon; mecholyl bromide was given in doses of 200 mg. twice a day. All this was to no avail, and after two and one-half weeks on this therapy, his abdomen remained distended and enemas were necessary.

The repeated failure of the most promising and well-recognized medications in the treatment of this patient prompted a search for a drug heretofore untried in congenital megacolon. Carbaminoylcholine seemed a likely possibility, particularly because of its selective action on the intestines.

Accordingly on Sept. 6, 1946 (age 1 year, 10 months), doryl (carbaminoylcholine chloride Merck) was begun in doses of ⅓ mg. three times daily, after meals, orally. There were no toxic effects, and he had occasional bowel movements. The dose was carefully increased to ¾ mg. after meals three times daily and by October 3 he was having one bowel movement daily. At the end of that month it was decided to discontinue medication, both in order to have a control period, and to determine whether the stimulus given by doryl would establish daily movements. He had regular bowel movements for one and one-half months thereafter. However, by Jan. 13, 1947, his abdomen was again becoming distended (circumference 21½ inches), and he did not have bowel movements for three to four days at a time, and then only following enemas. Doryl was again resumed in doses of ¾ mg. after meals three times a day, but he still required enemas for the next nine-day period, and his abdomen increased to 21¾ inches in circumference. Not until doryl was increased to 1 mg. after meals three times a day did he begin to have daily bowel movements starting on February 1 (age, 2 years, 2 months). The only episode of toxicity occurred when he was once given ¾ mg. five times daily and emesis developed for one day. He received 1 mg. three times daily and mineral oil daily until April 24, at which time it was reduced to 1 mg. twice daily with daily bowel movements continuing. This period of eight and one-half months (at the time

neither excreted nor reabsorbed by the tubules. The amount of inulin which is "cleared" from the blood per minute depends entirely on the amount of plasma which is filtered through the glomeruli per minute; therefore, the inulin clearance is, for all practical purposes, the same as the rate of glomerular filtration. Other substances, such as diodrast, phenolsulfonthalein, and sodium para-aminohippurate (PAH) are excreted almost entirely by the cells of the proximal convoluted tubules. This excretory mechanism works with great efficiency, so that at low plasma levels, diodrast and PAH are completely removed from the blood in one passage through the kidney, and the only limitation to the amount of these substances which can be excreted is the amount of blood which passes through the kidney. The clearance of diodrast or PAH indicates, therefore, the minimum rate of plasma flow through the kidney. Since only the plasma which perfuses functional tubular cells can be measured in this way, the clearance of diodrast or PAH is equal to the effective renal plasma flow, and does not measure the total circulation through the kidney. The normal value for this clearance is so high, however (about 690 c.c. per minute), that the total flow cannot be much greater. It may be expressed: $C_D = C_{PAH} = RPF = 690$ c.c. per minute.

This excretory mechanism which works with such great efficiency at low plasma levels can be overloaded by raising the plasma concentration. If the excretion of diodrast is plotted against a rising plasma level, the excretion increases in a straight line to a certain point, at which it levels off and does not increase further, no matter how high the plasma concentration. At this point of maximal excretion the mechanism for the transfer of diodrast across the cell is saturated, and this saturation level is known as the diodrast T_m (transfer maxima). When all of the tubular cells are saturated, that is, excreting maximally, the amount of diodrast which can be excreted depends entirely on the number of tubules excreting. The diodrast T_m is, therefore, a measure of the total number of functioning tubules, or of the tubular excretory mass. T_mD = Maximal Excretion = 40 mg. per minute = tubular excretory mass. The same is true, of course, for PAH, except the average normal value is 78 mg. per minute.

A study of twenty-two nephritis patients by these methods[1] indicated that the anatomical term "glomerulonephritis" is not entirely correct, since even in the earliest stages of acute nephritis, the tubular function also is impaired. That the damage is predominantly glomerular, however, is borne out by the finding of a greater impairment of glomerular function, that is, filtration, than of tubular excretion. The ratio $\frac{FR}{T_mD}$ was found to be low, as was also the filtration fraction $\frac{FR}{RPF}$, indicating that there was greater impairment of filtration than of circulation through the kidney. This fits in very well with the pathologic findings in this stage of the disease.

In the later stages of nephritis, all of the functions studied (FR, RPF, and T_mD) showed a parallel fall, although the low ratio of glomerular function to tubular function remained. Diastolic hypertension did not regularly develop unless there was a marked decrease in tubular excretory mass, reflected in a fall

ECTROMELIA AND ASSOCIATED DEVELOPMENT DEFECTS

HAROLD E. STADLER
INDIANAPOLIS, IND.

CLOSE collaboration between biochemist and embryologist has led to a greater understanding of the origin of the so-called "congenital anomalies." Experimental production in animals of some of the developmental defects observed in man has been invaluable in this broad study though it is true that many factors employed experimentally (electrical and traumatic stimulation, temperature change, and various dietary deficiencies) do not operate in carefully studied human subjects.

This report concerns itself with observations made of an infant who at birth was found to be afflicted with multiple deformities and absence of one upper extremity.

A. T. was born on Jan. 18, 1946, and his birth weight was 7 pounds. The mother was a 21-year-old unmarried Negro girl. The health of the father was excellent and congenital deformities in each family were unknown. A Wassermann test performed on the mother was negative. The mother stated that during her pregnancy she gained 20 lb. (from 120 to 140 lb.). Quickening occurred at 16 weeks and no abnormality of fetal movement was experienced. She denied edema of the legs, and the abdomen did not enlarge excessively. No infection occurred during her pregnancy and she was questioned particularly about viral infections.

The infant nursed poorly with frequent nasal regurgitation, and fever to 102° F. occurred on the fifth day after birth, with a rise to 104° F. on the eighth day. He was transferred to the pediatric service where the following abnormalities were noted:

The left upper extremity was absent, the stump at the shoulder being well healed. The right upper extremity appeared small, due to contracture of the elbow and absence of the thumb and index finger. The hand presented a smooth, narrow appearance. The left lower extremity was slightly longer than the right lower extremity (one centimeter) and had a *genu recurvatum* deformity. The hips were normal.

Prominence of the forehead suggested hydrocephalus, but the occipitofrontal circumference was 36 cm. The sclerotics were markedly bluish and bilateral atresia of the external auditory canals was present with thickening of the lobes of the ears. Hypoplasia of the mandible was evident with limited motion of the temporomandibular joints. The hard palate was narrow and high and ended posteriorly at a narrow slit which represented the throat. There was a generalized fine papular rash, most marked on the face.

Laboratory: There was no abnormality of the urine. The hemoglobin was 14 Gm. per 100 c.c. of blood, the leucocyte count, 10,250 with 45 neutrophiles, 2 bands, 1 eosinophile, and 52 lymphocytes.

Radiologic Study: The left upper extremity was absent with exception of a rudimentary humerus 19 mm. in length and 2 to 3 mm. in width in comparison to the right humerus, which was 75 mm. in length and 5 to 12 mm. in width. A flexion contracture of the right elbow was seen with relative shortening of the radius in comparison to the ulna. No carpal ossification centers were seen and

From the Department of Pediatrics, Indianapolis City Hospital.

Psychologic Aspects of Pediatrics

GLUTAMIC ACID AND MENTAL FUNCTIONING

HARRY BAKWIN, M.D.
NEW YORK, N. Y.

IN 1943, Price, Waelsch, and Putnam[1] reported that the administration of glutamic acid to patients with petit mal and psychomotor attacks led to an increase in mental and physical alertness. The degree of improvement in mental efficiency could not be correlated with the decrease in the number of seizures. The treated patients appeared to be happier and more congenial. Mood swings were less pronounced and behavior mannerisms were ameliorated.

These findings were not anticipated. Glutamic acid was tested in epileptics because it yields free acid which, it has been suggested, is anticonvulsant. Furthermore l-glutamic acid is the only amino acid known to be metabolized by slices of brain tissues.

Zimmerman and Ross[2] observed significant differences in maze learning between white rats fed glutamic acid and a control group, the treated group mastering the maze in less than half the time taken by the controls.

Albert, Hoch, and Waelsch[3] were able to raise the level of mental functioning in seven out of eight mentally deficient patients with total daily doses of 8 to 10 Gm. of glutamic acid.

More recently Zimmerman, Burgemeister, and Putnam[4] reported the results of glutamic acid therapy upon mental functioning in children and adolescents of various intellectual levels (Intelligence Quotients ranges from below 30 to 131). Using a wide barrage of tests, they found that glutamic acid accelerates mental functioning generally as indicated by verbal, motor, and Rorschach tests. The most striking changes were observed in the seriously retarded group. The average increase was about seven points on the Stanford Binét test. In two children the Intelligence Quotient rose 16 and 18 points, respectively.

The efficacy of glutamic acid depends on its continuous use. Its favorable effects disappear quickly when it is discontinued.

Glutamic acid may be administered in tablet, capsule, or powder form. It is dispensed in 0.5 Gm. capsules and tablets. It may be incorporated in the food. It is best given at the end of the meal or immediately afterward to minimize gastric distress. A suitable initial dose is 2 Gm., three times a day. The amount is increased gradually to the point where there is overactivity and distractibility and noncooperativeness of the child. When these manifestations appear the dose is gradually decreased. Occasionally there is insomnia. In such instances the last dose of the day is given in the later afternoon instead of at bedtime.

From the Department of Pediatrics, New York University, College of Medicine.

there were only three digits, one of which included a metacarpal and two phalanges. The other two digits each consisted of a metacarpal and three phalanges.

The epiphyses at the left knee were unusually flat. There was an ossification center for the upper end of the tibia as well as the lower end of the femur. *Genu recurvatum* deformity was present on the left with posterior displacement of the femur in relationship to the tibia.

Course: Growth was slow with the weight on May 18, 1946 (age 4 months), found to be 8 lb., 10 oz., and head circumference 41 cm. in the occipitofrontal plane. The weight was 10½ lb. at 8 months of age. There was a constant nasal discharge.

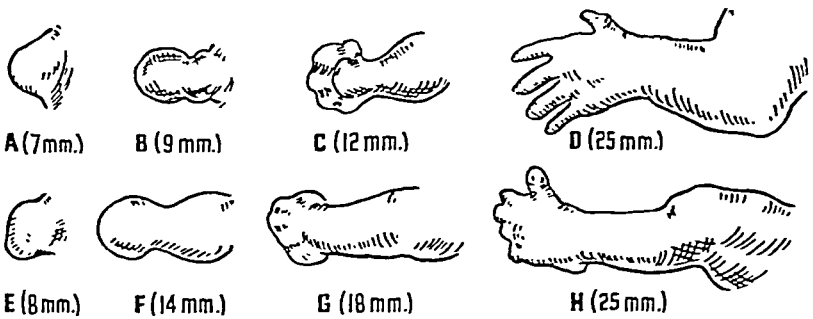


Fig. 2.—Stages in the development of the limbs between 5 and 8 weeks. (×6.) Upper row, upper limb; lower row, lower limb. (Arey: Developmental Anatomy, Philadelphia, 1940, W. B. Saunders, ed 4.)

DISCUSSION

The development of the extremities follows this pattern according to Arey.[1]

"The limb buds appear late in the fourth week as lateral swellings but due to early dominance of the head-neck region the arms seem to be located far down the body. The distal end of the limb bud flattens and a constriction divides this paddle-like portion from a more proximal, cylindrical segment. Later, a second constriction separates the rounded part into two further segments and the three divisions of arm, forearm, and hand or thigh, leg, and foot are then respectively marked off. Radial ridges, separated by grooves, first foretell the location of digits. These elongate into definite fingers or toes, and rapidly project beyond the original plates; the latter by a slower rate of growth becomes restricted to webs about the basal ends of the digits. The thumb separates widely from the index finger and the same is true of the great and second toes.

"The upper limb buds appear first, begin their differentiation sooner and are earlier in attaining their final relative size. Not until the second year of childhood does the leg equal the arm in length; its continued faster elongation throughout childhood is a conspicuous part of post-natal development."

Stockard[2] pointed out that embryonic growth is marked by a changing rate for the organism as a whole. The variation in rate of growth must remain within definite limits in order that a normal individual be produced. Various tissues have their specific rate of elaboration, which means that inequalities will be present with potentiality for an equalization by cessation of protoplasmic activity.

The tissues which had gained the most rapid growth would then (if growth ceased) be forced to start again on equal terms with other parts. Balance under these circumstances would indicate an inequality essential for normality. Type differences in malformation would depend upon the period of growth in which the disturbance appeared with the same general explanation applicable for

The Social Aspects of Medicine

NOW IS THE TIME

A Proposal Concerning Prepayment Medical Care

Walter A. Noehren
Vancouver, Wash.

The development of a medical care program in this country has made considerable progress in the past decade. Progress is too slow however, and we are constantly threatened by possible revolutionary changes in medical care such as are proposed in some of the present bills before congress. It is clear that a change will come and that the time is short. It is disappointing to realize that the American Medical Association has fallen into the role of conservative moderator in this problem. The present attempts to provide care by voluntary prepayment plans cannot solve many of the basic aspects of the problem. The present American Medical Association program (1) will not reach low or indigent income groups, (2) will not give complete care, (3) is proving inefficient, (4) does not pay the full cost of hospitalization, (5) is not creating adequate facilities, (6) does not support research, and (7) is not reaching rural and sparsely populated areas.

The American Medical Association, if it wishes to control medical practice in this country, as it certainly does and as is proper, should develop a more comprehensive approach to the problem now. A step forward must be found which will further progress, yet which will allow physicians and patients their proper relationships. The following proposal suggests one possible method of accomplishing this. The proposal is:

That each individual in the country would be required by law to pay, each year, a sum adequate for his complete medical care. He would pay this to a prepayment medical care plan which exists in his area and which is properly incorporated as a nonprofit organization. Those unable to pay such a fee would apply for payment in whole or in part of this fee by government to a medical care plan selected by the individual. These latter persons would be, for the most part, those who are now receiving government care through welfare agencies, but might include also the very low income groups. Evidence that such payment had been made for the current year would be required by the Bureau of Internal Revenue at the time of income tax declaration. Government agencies would not directly handle funds except for those unable to pay. This method of required prepayment would be roughly comparable to present methods of payment of automobile liability insurance in states where such insurance is required by law.

The laws of incorporation for prepayment plans would be broad enough to allow all of the forms of prepayment plans which now exist except for those which are run for profit. Such plans would include: (1) those of the medical societies, which are a form of producer cooperative; (2) those run by physician groups but not necessarily under medical society sponsorship; (3) those of nonprofit corporations or foundations, and (4) those which are consumer cooperatives. All of these types exist at the present time and in some areas there is already a wide choice available between various prepayment plans, although almost none offer complete care. The plans should necessarily, to accomplish their full purpose, cover all aspects of medical care including hospitalization.

Under such a proposal, the total amount of money spent in this country for medical care would be only as much more as would be required to produce the

extremities and with regard to the right hand, it was clearly evident that the lack of two digits constituted a deficiency rather than an amputation process.

The general findings here are somewhat at variance with the criteria laid down by Cummins.[10] This author has offered the following division between the agenetic and amputation groups:

"1) Agenesis is limited to one extremity *commonly* while true amputations are multiple and typically occur in two or more extremities.

"2) The most extreme defect of agenesis is expressed in the skeleton. At the distal end of the affected member the soft tissues often build up a diminutive and imperfect construction of the suppressed part.

"3) There is a semblance to a surgical stump in intrauterine amputation and the identity as a true amputation is evidenced not only by the aspect of a repaired wound, sometimes with adherent fibrous tissue, but also by the occurrence of one or more furrows."

SUMMARY

There is presented an infant who showed diffuse developmental defects involving the upper extremities and head. It is not possible to establish definitely either a hereditary or infectional basis for the skeletal changes present.

Evidence that amniotic bands were responsible for "intrauterine amputation" in this case is entirely lacking.

The author expresses his appreciation to Dr. J. K. Berman for his valuable suggestions and to Joseph F. Goldsmith for his help with the photographic details.

REFERENCES

1. Arey, L. B.: Developmental Anatomy, Philadelphia, 1940, ed. 4, W. B. Saunders, pp. 159-160.
2. Stockard, Charles R.: Am. J. Anat. 28: 115, 1920-21.
3. Streeter, George L.: Focal Deficiencies in Fetal Tissues and Their Relation to Intrauterine Amputation. Contributions of Embryology, 1930, Carnegie Institute of Washington, vol. 22, No. 126, 133.
4. Hirst, B. C., and Piersol, G. A.: Human Monstrosities, Edinburgh and London, 1892, Young J. Pentland, Part I.
5. Latta, J. S.: Am. J. Obst. & Gynec. 10: 640, 1925.
6. Bizzaro, A. H.: Lancet 1: 898, 1936.
7. Killingsworth, W. Price, and Engledow, R.: Am. J. Dis. Child. 63: 914, 1942.
8. Levy, J.: South. Med. J. 34: 1085, 1941.
9. Chandler, F. A.: Orthopedics. Brennemann's Practice of Pediatrics, Hagerstown, Md., 1942, W. F. Prior Co., vol. 4, ch. 34, p. 22.
10. Cummins, Harold: Congenital Amputations. Brennemann's Practice of Pediatrics, Hagerstown, Md., 1942, W. F. Prior Co., vol. 4, ch. 24, p. 1.

left to pay the physician's fee. Medical care is very costly at best, and must be given with economy. Under whatever system, voluntary or compulsory, the medical societies must fully realize this point before prepayment care can succeed. In addition, a considerable education of the general public is required, for many patients attempt to misuse prepayment, largely through misunderstanding. Patients must be reasonable in requests for care, and they must be educated in this reasonableness by the medical profession.

Among the outstanding medical groups in the country are the medical school faculties. A few of these at present are developing participation in prepayment plans. Many others are talking about doing so. The university groups today are faced with problems which will need solution soon. Because of diminishing income from endowments, there is a real need for more money. Because of dependence on indigent patients for teaching material, there is need for more patients in periods of prosperity such as was experienced during the war, and which we all hope may be achieved in peace time. Under a plan of required membership in prepayment plans, as suggested, the university physician groups could organize as prepayment groups and because of their great prestige, would attract a large patient clientele. They would actually tend to dominate the practice in some areas. This would be proper and in keeping with their excellence. Each might be part of a medical society plan, or might compete with a medical society plan. In any event, the university groups would receive a large income from their work, and would have an increased patient load consisting of patients who, by their joining a university plan, would have expressed their willingness to be used for teaching purposes. It has been well shown that most people do not object to this, but recognize its advantages to them as patients. Students and physicians in training would then deal with patients on a proper level.

The present county, city, and charity hospitals would change their status completely under the proposed plan of required prepayment insurance. These facilities would become, in fact, private hospitals and would accept staffs suitable to their board of directors. There would no longer be the charity or welfare patient, which would be a blessing for all concerned. The inadequate care which patients now receive in many isolated and understaffed county hospitals would be improved because of increased physician economic interest in these patients.

Under a plan of required membership in prepayment plans, as proposed, no physician group would ever be able to relax in its efforts to do good work. The public in the course of time will be an even better judge of medical care, and will express this judgment in its choice of prepayment plan. Monopolization of prepayment would be very unlikely, since groups as small as ten men would be able to form prepayment plans would could effectively compete in the field. Smaller groups would have to refer some of their more specialized work, such as neurosurgery, to larger centers and would pay fee-for-service for such work.

The individual patient could be given the privilege of changing groups, but he should not be allowed to do so more than once in a given period of time without special justification. To shop from doctor to doctor is poor and an extravagant way to seek medical care. This shopping about is too frequently indulged in under present medical society plans.

The supplementary use of private consultants would occur and has been experienced under some of the already existing prepayment plans, where it fills an excellent role. Occasionally, in the case of serious illness, the patient or his family feels the desire for further opinion. The group caring for the patient under prepayment considers the care already being received completely adequate, but does not object to further opinion. The family, having no expense for the illness, since it has been provided for under prepayment, is able to afford even sizable consultant fees. The consultant is called in and the situation benefits from this added, though usually unnecessary, opinion.

that he had had asthma for three years, and that four months prior to his admission here, during an asthmatic attack, slight periorbital edema developed. Shortly afterward the edema became generalized and the patient was hospitalized in a South Carolina hospital, where the edema completely subsided in seventeen days. He was then asymptomatic for three months, which period was followed by generalized edema, oliguria, and the passage of dark red urine.

On his first admission here, on Aug. 8, 1946, the temperature was 37° C. (98.6° F.), pulse 116, and blood pressure 115/70. The patient was markedly edematous from his toes to his nipple line, and his face and eyelids were similarly affected. The abdomen was markedly distended. A fluid wave and shifting dullness were demonstrable. Both lung bases were dull to percussion. The hemoglobin was 10.7 Gm., WBC 6,150, and the differential 61 segmentals, 3 stab cells, 2 J's, 25 small lymphocytes and 9 eosinophiles. There was no sickling of the red blood cells. The urine on admission had a specific gravity of 1034, 4+ albumin, 15 to 20 white blood cells and 3 to 4 granular casts, but no red blood cells in a centrifuged specimen. The stool examination and the tuberculin (0.1 mg.) and Schick tests were negative. The blood nonprotein nitrogen was 72 mg. per cent, urea nitrogen 53 mg. per cent urea ratio 73.1, uric acid 7.6 mg. per cent, total proteins 4 Gm., with 1.2 Gm. albumin and 2 to 8 Gm. globulin and the albumin-globulin ratio 0.42. The initial cholesterol was 720 mg. per cent. The heart and lungs were negative by x-ray.

The patient was placed on a high protein and low salt diet. On his third hospital day he was given 200 c.c. of plasma intravenously and the same or slightly larger amounts of plasma eleven more times during his hospital stay. Theobromine was given without effect. Paracentesis was performed on three occasions to remove abdominal fluid. Modified Southy tubes were used, one in each foot, with the removal of much fluid. During his stay, diarrhea developed, and penicillin and sulfadiazine were given. Stool cultures were negative for pathogens. The edema, urinary albumin, casts, and occasional red blood cells gradually decreased, though the white blood cells persisted. The patient's weight on admission was 37 kg. (81.4 pounds); at the end of two weeks it was 34.2 kg. (75.2 pounds); and on discharge on Oct. 5, 1946 (fifty-eighth hospital day). was 27 kg. (59.4 pounds). On discharge, the blood nonprotein nitrogen was 26 mg. per cent; total protein 3.7 Gm., albumin 2.1 Gm., globulin 1.6 Gm., and albumin-globulin ratio 1.3. There were only traces of urinary albumin.

Except for persistent albuminuria and a cold in November, 1946, the patient was well until July, 1947. Then a cold was followed by puffiness of the eyelids, swelling of the abdomen, and marked exertional dyspnea. One week before this admission on Aug. 27, 1947, severe scrotal and penile edema and marked oliguria (one to two times per day) developed. The urine frequently was dark red. The patient gained 3 kg. in weight during the three weeks before admission. When he was readmitted to Duke Hospital on Aug. 27, 1947, he presented the same physical abnormalities as on his first admission. The lung bases were markedly elevated bilaterally. The hemoglobin was 14.6 Gm. (94 per cent), W.B.C. 12,400, R.B.C. 4.4 million, the differential 3 segmentals, 4 stabs,

only with government help. This phase of medical care can become as unhappily involved in politics as can the practice of medicine itself, and it can interfere considerably with the practice. In its attempts to preserve its own dignity, why does the medical profession lean so heavily in this respect on government and on Blue Cross, a lay corporation? The unity of medical practice and hospitalization must be realized.

Under the proposed plan of required prepayment insurance there would be no excuse for further extension of public health administration into general medical care, and in some fields already invaded, this work could revert back to the practicing physicians where it belongs. Public health administration should continue more or less as it now exists, but should be made available in all areas. All problems of clinical medicine, however, should be handled by the practicing physicians. The public health authority should limit its activity to such work as study of epidemiologic data, enforcement of therapy as prescribed by law, sanitation, pest control and the like. A closer unity of purpose could be achieved in public health since the health authorities would be dealing with physician groups rather than with a large number of individual physicians. Reporting of infectious disease, poorly done by individual physicians, could be accomplished better through groups. Economic want would never interfere with adequate therapy. The medical profession should welcome a means of stopping the broadening powers of the public health authority, and the public health authority should be happy to be able to administer an effective program without the need to indulge in actual medical care. In a few specialized fields now well established, it might be desirable to continue governmental administration, as in tuberculosis and in mental illness.

The care of veterans, under the proposed plan, could be accomplished by having the government pay the prepayment fee for nonservice connected care of the veteran to a physician group of the veteran's choosing. Service-connected disabilities could be handled as at present, either in veterans' hospitals or by special contract with practicing physicians. The huge new veterans' hospitals might better be general community hospitals staffed by local physicians rather than by straight government employees.

Under this proposed plan of required prepayment insurance, the role of government would be limited even more than it is at present, since all welfare care would be placed back on a patient-physician relationship, government ownership of hospital facilities would be reduced, and public health authority would be limited. The role of government would be limited to writing the laws regulating prepayment corporations (as is done under voluntary plans), arbitration of these laws, investigation of individual income as concerns ability to pay for medical care (as is done for income tax and for present welfare care), and distribution of tax-raised funds to medical prepayment corporations, but always to the corporation selected by the individual citizen, free of political pressure. It is difficult to see how a government bureaucracy could evolve under this type of control, or how politics could have much influence.

The competitive profit motive in medical practice could be fully maintained, just as in voluntary plans. A large new source of income to physicians would accrue from the establishment of regular fees for patients now treated for substandard welfare fees or as charity patients.

Should such a proposal be effected, it would not be an irreversible move, but could be discontinued with a return to present status. The final outcome of such a plan would depend almost entirely on the ability of the medical profession to produce good care economically and in a form satisfactory to patients. If the physicians themselves failed in their administrative functions, they would possibly become the servants of consumer cooperatives. It is most likely, however, that consumer cooperatives would fall by the wayside because of their

Prognosis.—Good; 90 per cent recover, but 28 per cent may have recurrences In 6 per cent, the condition becomes chronic, usually in patients whose onset has been gradual; they terminate in true uremia, usually with anuria.

The second patient is a typical example of nephrosis or tubular or lipid nephritis, which causes less than 1 per cent of the albuminurias of childhood. It is a distinct clinical entity in children at the onset, which usually is gradual, and is chiefly characterized by edema and albuminuria without hematuria. As the condition progresses, glomerular and interstitial kidney changes occur. Preceding infections are less frequent than with glomerular nephritis, though it may follow URIs, malaria, poisoning, etc. The edema may subside within a few days, the albuminuria markedly diminishing and occasionally disappearing spontaneously; more usually, however, the edema may persist several weeks before disappearing, only to reappear weeks or months later Some patients have several exacerbations over a period of years Hypertension and hematuria, which are rare, increase the gravity of the prognosis

Treatment.—Nothing but sodium-free (dialyzed) milk and the usual vitamins should be given for the first few weeks Lonalac is a satisfactory preparation and the amount should be sufficient for the caloric needs. After the edema recedes, sodium-free bread, eggs, salt-free vegetables and small amounts of meat may be added. Abdominal paracentesis may be necessary, but the needle should puncture the peritoneum at a distance from the skin insertion to prevent leakage Measles temporarily reduces the edema Penicillin and sulfatherapy are necessary if peritonitis, skin, and other infections occur.

Unproved Remedies.—High and low protein diets, antuitrin-G, B-complex, liver extract, mercurial and xanthine diuretics, pitressin, riboflavin, thiamin, thyroid, urea, $CuSO_4$, KNO_3, NH_4NO_3, $MgSO_4$, and intravenous acacia, albumin, amino acids, blood, dextrose, globulin, plasma, and serum.

Prognosis.—Poor; recurrences are frequent and the mortality is 60 per cent However, the patient may completely recover, even after several recurrences.

The third type of nephritis, the interstitial variety, usually is an end stage of repeated attacks of pyuria (pyelonephritis). It also may follow bacteremia, diphtheria, scarlet fever. There is no accepted treatment, and the prognosis is bad

DR. WALTER CARGILL.—A new approach to the problem of nephritis is offered by studying kidney function, by means of the clearances of various substances, such as the urea clearance, inulin clearance, diodrast clearance, etc. The "clearance" of a given substance is the volume of blood which is "cleared" of that substance by the kidney per unit of time. It may be expressed by the formula, $C = \frac{UV}{P}$ in which C is clearance (cubic centimeters per min.), U is the concentration in the urine (mg. %), V is the rate of urine flow (cubic centimeters per min.), and P the plasma level (mg. %).

Since certain substances are handled by the kidney in a particular fashion, their clearances have unusual significance. For example, inulin is a complex polysaccharide which is excreted solely by glomerular filtration: that is, it is

Comments on Current Literature

INFECTIOUS DISEASE IN PREGNANCY AND FETAL MALDEVELOPMENT

BIOLOGISTS and clinicians alike have recognized for many years that two main mechanisms are involved in abnormal development: intrinsic abnormalities of germinal origin, and those abnormalities which are produced by external influences upon essentially normal ova.

As early as 1909 Stockard[1] made the following salient remarks:

> The well-known congenital defects of the heart and other parts of the vascular system, digestive tract, as well as the numerous developmental arrests in various parts of the body, remind the observer of the great loss in ability that the race suffers as a result of faulty development. These defects in construction must be considered a disease which causes death of about 23 per cent of the human race before or shortly after the time of birth, and handicaps a certain proportion of the survivors throughout their lives. We carefully study and use all known precautions to protect ourselves against post-natal infections and diseases, and much interest and time is given to combating the causes, yet little is said and scarcely anything done toward a control of development or the hygienic protection of the developing individual.

However, it remained for Gregg[2] through studies of rubella in pregnancy, to make clinical application of the discoveries of pioneers in this field, notably, Stockard and Mall. Gregg in 1941 first reported the relationship between rubella in the pregnant woman and congenital abnormalities in children. The most commonly noted defects are congenital cataract and other ocular effects, malformations of the heart, and microcephaly and mental retardation. Less common effects which have been noted are hydrocephalus, deafness and deaf-mutism, and cryptorchism. Since 1941, a large number of cases of congenital abnormalities associated with maternal rubella have been reported, approximately 500 according to Ingalls,[3, 4] the majority of these being discovered by the investigation of pregnancies which resulted in defective infants.

While these reports are of considerable interest, it has been emphasized recently that "the existing need is for further exploration of the causes of abortions, monstrosities, and congenital anomalies through correlated epidemiologic, clinical, and teratologic studies."[3]

Ober, Horton, and Feemster,[5] in a recent report dealing with congenital defects in a year of epidemic rubella, approached the rubella problem from an epidemiologic point of view. Of 35,000 cases of rubella reported in this 1943 epidemic, which was at least twice the usual incidence, 3,000 cases occurred in females in the age group 17 to 49 years. Response to a survey by mail of the reported cases in females yielded the following information: of the 1,164 women who responded to the questionnaire, 438, or 38 per cent were married at the time of their infection; forty-nine, or 11 per cent of the 438 who were married were pregnant when they had rubella. In addition, five cases of rubella during pregnancy occurred in years other than 1943, making a total of fifty-four cases. Of five women who had rubella during the first month of pregnancy, two aborted, two had defective infants, and one had a normal infant; thus, 80 per cent of infants in this instance were either lost or defective. Where the infection occurred in the second month of pregnancy, 50 per cent of the infants were lost or defective: of eight infants, two were stillborn, two were defective, and four were normal. In the third month of pregnancy, two abortions and one defective infant were recorded with six infants normal, or 33⅓ per cent of the infants lost or defective: with rubella in the fourth month, of five instances, three

of T_mD to 20 mg. per minute or less. These functional studies have failed to reveal a distinct difference between nephritis and nephrosis.

Edema formation is closely related to the retention of salt. Salt is normally filtered by the glomeruli and almost completely reabsorbed (98 to 99 per cent) by the tubules. It is conceivable that if the filtration rate is reduced while the tubular reabsorption is relatively unimpaired, there will be a tendency toward retention of salt. Conversely, if there is greater damage to the reabsorptive mechanism than to filtration, there will be a net loss of salt. Some such disturbance in the functional organization of the nephron may be the basis for the distinction of the clinical types of nephritis.

DR. BERNARD BLACK-SCHAFFER.—Glomerulonephritis is an inflammation of the kidney. Regardless of the etiology of the lesion, the basic pattern is similar to all inflammation. Examination of a section by a student may not lead to a positive diagnosis in most instances, because acute glomerulonephritis is frequently characterized only by minimal increased cellularity of the tufts. Such an increase commonly is due to an accumulation of polymorphonuclear leucocytes and a proliferation of the endothelial cells of the capillaries. In common with all inflammatory lesions, the degree varies from minimal to maximum. The example of nephritis presented by the first patient would be represented by minimal lesions. Since a fatal outcome is most uncommon, it is difficult to illustrate the above statement with histologic material. While it is true that the structure most prominently involved is the glomerulus, the proximal convoluted tubules are involved. Not infrequently in severe cases hematuria is pronounced. In such instances, the kidneys, when examined, reveal, in addition to the simple changes described above, hemorrhage from the capillaries of the tufts, producing what has been called hemorrhagic nephritis. This nephritis does not differ from the nephritis described above, but is merely an expression of greater capillary damage. As in all inflammatory processes, healing may occur in glomerulonephritis. Where minimal damage was produced, the healing process is complete and no residuum remains. On the other hand, where the damage is more severe or progressive, irreversible changes may occur, resulting in so-called subacute and chronic glomerulonephritis, with ultimate kidney failure.

Nephrosis is a problem which has raised a controversy between the pediatricians and the pathologists. Pediatricians, on one hand, consider nephrosis to be an entity divorced from glomerulonephritis. Pathologists, on the other hand, basing their conclusions on autopsies of patients who have died after repeated exacerbations of nephrosis, have decided that it is only a stage of glomerulonephritis. However, the rare autopsies on patients who have died early in the course of nephrosis show that the tubules are more markedly implicated than the glomeruli and interstitial tissue, although they, too, are damaged.

REFERENCE

1. Earle, D. P., Jr., Taggart, J. V., and Shannon, J. A.: Glomerulonephritis. A Survey of the Functional Organization of the Kidney in Various Stages of Diffuse Glomerulonephritis, J. Clin. Investigation 23: 119-137, 1944.

News and Notes

Dr. Guy W. Brugler, Assistant Director of the University Hospitals in Cleveland, has been appointed Director of the Children's Hospital of Boston, and the proposed $10,000,000 Children's Medical Center. Dr. Brugler who has been with the University Hospitals in Cleveland since 1939, served with the Army's 4th General Hospital in Australia and New Guinea, and later was executive officer at the Woodrow Wilson Army Hospital at Staunton, Va. He is a member of the Senior Medical Advisory Group to the Veterans' Administration.

The **American Academy of Pediatrics** will hold the following meetings in 1948:

National Meeting.—Nov. 1-4, 1948, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.

Areal Meetings.—April 29, 30, and May 1, 2, 1948, Statler Hotel, Buffalo, N. Y., for Districts I, II, III, and IV.

June 28 to 30, 1948, Hotel Schroeder, Milwaukee, Wisconsin, for Districts V, VI, and VII.

Sept. 13 to 15, 1948, Olympic Hotel, Seattle, Washington, for Districts VI, VII, and VIII.

Poliomyelitis occurred in epidemic form in a number of European countries in 1947, according to the epidemiological Record of the Interim Commission of the World Health Organization.

In England and Wales an epidemic started early in June and by mid-August nearly 3,000 cases had been reported. The London area, the West Riding of Yorkshire, and Lancaster were the chief focal points. Some increase also occurred in Scotland. In France the reported cases were three times the median and in Austria twenty times the median. In Italy the rate remained high as it was in 1946. In Belgium where it was epidemic in 1945 the rate remained low, as it did in Denmark, Finland, and the Netherlands. In Sweden where it was also epidemic in 1945 the rate for the first half of 1947 was low. In Switzerland the high rate of 1946 continued into 1947. An increase was reported as taking place during the summer in the occupied zones in Germany.

The effective dose varies widely and bears no relation to age. It ranges from 6 to 24 Gm. a day. In most instances, the larger doses are necessary in order to obtain an effect. Where there is gastric distress the dose is reduced until the symptoms disappear and then gradually increased to an effective level; or the glutamic acid is discontinued for a few days and then gradually increased as tolerance develops.

The clinical usefulness of glutamic acid is being actively investigated and more information about its clinical application will soon be available. It promises to be helpful in the treatment of children with retarded or borderline mentality where the rise of a few points in the Intelligence Quotient leads to an appreciable improvement in the child's performance at school and a bettering of his ability to cope with his school-fellows.

By encouraging the parents, it may be expected to improve parent-child relationships, thereby lessening emotional disturbances which so often exaggerate the plight of the slow child.

REFERENCES

1. Price, J. C., Waelsch, H., and Putnam, T. J.: dl-Glutamic Acid Hydrochloride in the Treatment of Petit Mal and Psychomotor Seizures, J. A. M. A. 122: 1153, 1943.
2. Zimmerman, F. T., and Ross, S.: Effect of Glutamic Acid and Other Amino Acids on Maze Learning in the White Rat, Arch. Neurol. and Psychiat. 51: 446, 1944.
3. Albert, K. E., Hoch, P., and Waelsch, H.: Preliminary Report on the Effect of Glutamic Acid Administration in Mentally Retarded Subjects, J. Nerv. and Ment. Dis. 104: 263, 1946.
4. Zimmerman, F. T., Burgemeister, B. B., and Putnam, T. J.: A Group Study of the Effect of Glutamic Acid Upon Mental Functioning in Children and Adolescents, Psychomatic Med. 9: 175, 1947.

Editor's Column

DR. PARK'S CENTENNIAL ADDRESS

Through the kind permission of The New York Academy of Medicine, the JOURNAL publishes in this issue (p. 599) the address of Dr. Edwards Park on "Changing Medical Care in Our Changing National Life," given at the Centennial meeting of the Pediatric Section of the Academy last March, when Dr. Park was the guest speaker. By publication in the JOURNAL, the address will be given a larger audience than it would receive by publication in the Academy Bulletin alone, and it was for this reason that it was made available by the author and by the Academy to the JOURNAL for simultaneous publication.

The ideas and thoughts of the author reflect his own viewpoints of course, and should not be construed as reflecting the opinion of the Academy of Medicine, nor of the Editor or Publisher of the JOURNAL.

In the opinion of the Editor, it is one of the most statesmanlike discussions of the problems of medical care that has been made. Whether one agrees or disagrees in whole or in part with Dr. Park's views, one must respect his clear thinking and sincerity, and admire the tolerant, unemotional way he has presented his discussion of the present-day problems of medical care. His criticisms are essentially constructive. We hope that our pediatric colleagues will spread the news of Dr. Park's address to their friends in other fields, as it is not a discussion of pediatric problems, but of the general problems of medical care.

MEDICAL CARE AND POLITICS

A short time ago we were discussing medical care and medical economics with a newspaperman who has been a close political observer for many years, and whose comments on political matters have a nationwide audience. Some of his comments were very penetrating. His opinion was that, whether or not the doctors liked it, and whether or not it was for the best interests of medical care for the people, medical care and medical economics are, today, a matter of politics. Both political parties in the United States look upon the subject as one of major political importance, and the chief question at issue is as to which party can get the credit for medical legislation, and in this way reap political benefit. As long as one party is in executive control and the other in legislative control, as at present, we would not have much medical legislation affecting the individual directly. If either party gained control of both branches in the next election we would have federal legislation in a hurry, as the party in power would gain political credit with the people. If the Democratic party should win both branches, we could expect a Wagner-Murray-Dingell bill to be enacted. If the Republican party should win, we could expect a very much changed Taft-Hartley bill, containing many of the provisions of the bill now fostered by the Democratic legislators, made into a law.

B. S. V.

extension of care which is demanded by modern standards. That modern medical care should be available now to all people is beyond question. Each individual would have to pay his annual fee, which would be sizable, but he would derive manifest benefits in return. Many people have already chosen to pay a portion of this fee voluntarily and would welcome the increased efficiency which would result from the extension of the insurance principle to the entire population. The private practice of medicine would continue as at present and any person could seek private care at any time with the exception that he could not seek such care from any physician on the panel of his chosen prepayment plan. He could seek such care from physicians on the panels of other plans, or from physicians who would wish to do private practice only. The only fundamental change which would occur in medical practice would be that fewer patients would seek private care since they would have prepayment care by a physician group of their own choosing available to them. The American Medical Association has already endorsed this principle however, and no other group, except profit groups, could object to such a change. There should be general agreement that medical care should never be conducted with a profit motive. Certainly an intermediary third party, even in the form of an insurance carrier, should never profit from medical care.

Should such a proposal as this be effected, a variety of changes would occur in the present management of medical care. It would seem that the whole evolution would favor the medical profession immensely.

The present wishful thinking about preserving the individual physician as an isolated practitioner would immediately cease, and the medical profession would have to cooperate among themselves in the necessity of proving their contention that medical care should be administered by physicians and not by lay individuals or by government. Because of the complexity and specialization in modern medical care, it is becoming clear that a physician can no longer practice as an isolated individual. Even the general practitioner is becoming a highly trained specialist who must have ready access to experts in a wide variety of fields to give his patients adequate care. He cannot practice alone, but must be part of a group. Such a group can be as small as five or ten men, or it can be considerably larger. It can be closely organized, or can be a more loose relationship. The medical societies themselves, which exist as county units, are essentially groups, and when such societies sponsor prepayment plans, the physicians on the panels of the plans are working as groups. Failure to realize this fully has been the major fault of the medical society prepayment health plans, for in these plans the physicians are often selfish in the use of prepayment funds. A physician may order laboratory studies or prescribe therapy which is extravagant and even of questionable value to the patient, or he may see a patient more often than is necessary, and thus use up funds needed for the care of other sick patients. He is thinking in terms of his individual patient and of his individual fee for service without giving proper recognition to the fact that he is one of a group of physicians attempting to provide care to a larger group of patients. The result of this has been an inefficiency which has made it necessary for the medical society prepayment plans either to charge higher fees or to reduce their coverage to the point where the plans have value only for serious or emergency illness.

All of the physicians on the panel of any prepayment plan must work together as a group so that they can give care where it has real value. This may seem to be compromising the judgment of the individual physician toward his individual patient, but this same compromise always exists in the patient-doctor relationship, except in the treatment of the very wealthy. In private practice the physician cannot order laboratory studies or hospitalization at will, because patients are often unable to pay for these, or because there would be no money

COPYRIGHT, 1947, BY THE C. V. MOSBY COMPANY

(All rights reserved)

Printed in the
United States of America

Press of
The C. V. Mosby Company
St. Louis

The phrases "freedom-of-choice of physician" and "fee-for-service," concerning which many physicians argue vehemently in current discussions of medical care, would be properly tested under such a plan as the one proposed. "Freedom-of-choice" is at best a relative thing and must be understood in its relationships to the number of physicians in an area, proper training for various specialized functions, ability of patients to choose a proper physician, and ability to pay. Certainly as much "freedom-of-choice" as can be obtained is desirable. Under present circumstances, a large portion of the population has exceedingly limited choice and many have no choice. It is a challenge directly to the medical profession to improve this situation both by making this freedom truly available and by educating the public to the ability to choose. Under this proposed plan of required insurance, each person would be able to choose a group, and even to choose a "family doctor" by selecting a prepayment group which would make a physician of his choosing available to him. The individual would further be able to change his group at least once in a time period, and he could always seek private care at his own extra cost. What further "freedom-of-choice" the medical profession would desire for their patients, they would have to provide and prove valid in group competition. It would not be possible to make allowance for extravagant misuse of "freedom-of-choice" and "fee-for-service" by cutting back on coverage or by other schemes such as indemnity plans, since complete coverage at proper over-all fee would be required of them. What the proper over-all fee would be could be determined accurately in the course of time by the competition between the various prepayment groups, and could be controlled properly by the medical profession. The profession's chance of achieving this proper income level may well depend on its ability to produce a real solution to the medical care problem before some revolutionary and irrevocable scheme is hoisted upon it.

Under the proposed plan of required prepayment insurance, the status of various types of hospital administration would not have to change at first, but one would expect an evolution of ownership and directorship of hospitals by the prepayment corporations which would give the advantage of increased efficiency with closer control of all hospitals by physicians. The fact that hospitals would be controlled by specific groups would not mean that other physicians need be excluded any more than under present methods of hospital control. The Permanente Foundation hospitals for example, which are run by physician groups who give prepayment care, are open staff hospitals and are used by other physicians of the areas for private patients. All physicians associated with prepayment groups would automatically have proper hospital relationships and privileges. This would directly solve the difficulties of the general practitioners who would realize their full importance in prepayment care.

The present status of hospitalization under medical society voluntary prepayment plans contains faults of which many are not aware. Most of the plans are content to extend limited hospital coverage usually under a separate contract with Blue Cross. The medical profession prefers to concern itself only with medical practice and is happy to have someone else worry about hospitalization. Even now, 70 per cent of the hospital beds in this country are in government control. Yet medical care and hospitalization are inseparable by modern standards and both should be controlled properly by the medical profession. The particular fault of present hospitalization insurance is that it is not adequate to pay for what it attempts to provide, since it depends on private patient income, on hospital endowments, and on government funds to pay much of the costs. If voluntary prepayment succeeds as well as the American Medical Association hopes it will, the private patient hospital income will diminish. Endowment is becoming increasingly scarce. Government subsidy of hospitalization must then become increasingly important. New facilities will be created

DENENHOLZ, EDWARD J. (WITH RAMBAR, ALWIN C., AND HOWELL, KATHERINE), Pertussis-parapertussis vaccine, 556
DOENGES, JOHN P., Peritonitis associated with neonatal diarrhea, 669
DONNELL, GEORGE (WITH FORBES, GILBERT, AND HERWEG, JOHN C.), The subcutaneous administration of sodium sulfadiazine, 375
DORRANCE, THOMAS O., Arachnodactylia, 679
DREIZEN, SAMUEL (WITH MANN, ARVIN W., AND SPIES, TOM D.), The determination of status and progress in children with nutritive failure, 161
DUANE, JULIA M. (WITH JACKSON, ROBERT L., KELLY, HELEN G., AND ROHRET, CECELIA HEALY), Rheumatic fever recurrences in children without sulfonamide prophylaxis: an evaluation of environmental factors, 390
DUFFY, CARL E., WOOLLEY, PAUL V., JR., AND NOLTING, WILFRED S., Rabies, 440
DUREN, NORMAN, AND FRANK, ROSA, Herniated ovary in an infant, 227

E

EBERLEIN, WALTER R., AND LYNXWILER, CHESTER P., The clinical picture of mumps meningoencephalitis and report of a case without parotitis, 513
ERGANIAN, JANE (WITH HARTMANN, ALEXIS F.), Treatment of diabetic acidosis, 274
EUSTIS, RICHARD S., The primary etiology of the specific language disabilities, 448

F

FORBES, GILBERT, DONNELL, GEORGE, AND HERWEG, JOHN C., The subcutaneous administration of sodium sulfadiazine, 375
—, SALMON, GEORGE, AND HERWEG, JOHN C., Further observations on post-tracheotomy, mediastinal emphysema, and pneumothorax, 172
FRANK, ROSA (WITH DUREN, NORMAN), Herniated ovary in an infant, 227
FREUD, PAUL, The ulcerated urethral meatus in male children, 131

G

GARDNER, LUTHER B., Cooley's erythroblastic anemia in two Chinese boys, 347
GILNER, ABRAHAM, AND NELSON, IRVING, Impetigo neonatorum congenita, 213
GLASNER, PHILIP J. (WITH MISSILDINE, W. HUGH), Stuttering, a reorientation, 300
GOETTSCH, ELVIRA (WITH COBLEY, GEORGE), Streptomycin in the treatment of miliary tuberculosis, 70
GREEN, FREDERICK C. (WITH NATHAN, ABRAHAM, AND WEISS, GEORGE), Congenital hemolytic anemia of the newborn caused by iso-immunization with agglutinogen B, 683
GREENBLATT, JACOB, Carbaminoylcholine (Doryl) in the treatment of congenital megacolon, 687
—, Hypersensitivity to privine, 355

H

HAND, ALFRED, Cerebral abscess: A complication of congenital cardiac disease (Fallot's tetralogy), 662
HARPER, PAUL, Observations on insect-borne diseases in the South Pacific campaign, 631
HARTMANN, ALEXIS F., Conference at the St. Louis Children's Hospital, May 23, 1947, 93
—, AND ERGANIAN, JANE, Treatment of diabetic acidosis, 274
HERWEG, JOHN C. (WITH FORBES, GILBERT, AND DONNELL, GEORGE), The subcutaneous administration of sodium sulfadiazine, 375
—, (WITH FORBES, GILBERT B., AND SALMON, GEORGE), Further observations on post-tracheotomy, mediastinal emphysema, and pneumothorax, 172
HOWELL, KATHERINE (WITH RAMBAR, ALWIN C., AND DENENHOLZ, EDWARD J.), Pertussis-parapertussis vaccine, 556
HUSSON, GEORGE S., Oral penicillin in infants, 651

J

JACKSON, ROBERT L., KELLY, HELEN G., ROHRET, CECELIA HEALY, AND DUANE, JULIA M., Rheumatic fever recurrences in children without sulfonamide prophylaxis: an evaluation of environmental factors, 390

K

KAGAN, B. M., AND MIRMAN, B., Sydenham's chorea, a syndrome for differential diagnosis, 322
KAJDI, LASLO (WITH LIVINGSTON, SAMUEL, AND BRIDGE, EDWARD M.), Febrile convulsions: A clinical study with special reference to heredity and prognosis, 509
KELLY, HELEN G. (WITH JACKSON, ROBERT L., ROHRET, CECELIA HEALY, AND DUANE, JULIA M.), Rheumatic fever recurrences in children without sulfonamide prophylaxis: an evaluation of environmental factors, 390
KELSEY, WESTON M., Idiopathic dilatation of the common bile duct in childhood, 211
KUTTNER, ANN G. (WITH MARKOWITZ, MILTON), A study of the absorption and excretion of oral penicillin in children, 195

L

LAHEY, M. E., LOMAS, R. D., AND WORTH, T. C., Lipochondrodystrophy (gargoylism), 220

indirectness. It is proper that medical care should be administered by physicians, not by physicians sitting in regional or national offices, and certainly not by physicians in government employ or in the cabinet, but by the physicians who are doing the actual competitive practice of medicine.

Under a proposal such as this, there would be no basic change in the present status of physicians except for their admission that they practice as groups and not alone. They would have all the patients, plenty of money, and the ability to create proper modern facilities in all areas. In sponsoring voluntary prepayment plans, the physicians have already endorsed the group principle. To hope that voluntary prepayment will solve the medical care problem in this country is unrealistic, even if it may seem the lesser of evils. A middle ground of sound principle must be found. It must be endorsed by the medical profession, and it must be soon.

Sept. 8, 1947

Dear Doctor Park:

Congratulations to you and to Dr. Veeder on publishing the Canadian Medical Association's "Submission Respecting Health Insurance" of 1943. The flexibility, the decentralization, the recognition of *inadequacy of distribution* of medical care, the obvious desire of the Canadian Association to *learn* and to cooperate with measures "not contrary to the public interest," indicate the social maturity that group has attained.

In your introductory note, you inquire plaintively, "Why then should they think so differently from us?" Why indeed?

I came across what seems very close to the right answer in a masterly editorial in the *Buffalo Evening News* of Aug. 1, 1947:

"While friend and foe join in recognizing the United States as the most powerful country on the face of the globe, many couple this admission of our strength with the charge that we are so immature mentally that we don't know how to make wise use of our power."

The writer of the editorial quotes with approval Dr. Bernard Iddings Bell's praise of the American college and university for producing competent technicians and reprehends them for failing to produce "human beings competent to live," citing Sir Richard Livingstone's definition of a technician as one who "understands everything about his job except its ultimate purpose and its place in the order of the universe."

The editorial closes with the admonition to our educational institutions to put further emphasis on ideas, moralities, philosophies, and faiths, in order to speed the *maturity of the Common Man.*

Now, Dr. Park, all this applies especially to us physicians, both young and old. Indeed, I am quite sure it is the reason your Column exists. Throughout medical school, internship, research, or practice it is so tremendously difficult to acquire, to keep up with, and to practice medical technology, that all too many competent physicians are socially and culturally the merest tyros. The recent, wartime acceleration, abridging premedical cultural training, eliminating intramedical vacations, has helped not at all. Even the pediatrician, whose very work partakes of preventive medicine, and sociology, not to mention politics, is in neither the Waltonian nor Davisonian sense *compleat,* if he has not looked to the acuteness of his social conscience.

The fact that we physicians have some excuse in our unremitting toil for a degree of extramedical immaturity, by no means confers adequate absolution. To whom so much is given, to him shall much be required. All too well do we deserve the rebuke given the complacent Pharisees: "These ought ye to have done and not to leave the other undone!"

PARK J. WHITE, M.D.

P

PALMA, JOSEPH, The social aspects of medicine, a statement, 117

PERRY, THOMAS L., Delayed exhibition of erythroblastosis fetalis after eight normal pregnancies, 578

PETERSILGE, CARL L., Prolonged anuria following a single injection of a bismuth preparation, 580

PEYTON, WILLIAM T. (WITH SIMMONS, DONALD R.), Premature closure of the cranial sutures, 528

PLATTNER, EDWARD B. (WITH BLATT, MAURICE L., LEVINE, MILTON, AND MELZER, FRANRESKA), Phthalylsulfathiazole in the treatment of diarrhea in children, 548

R

RAMBAR, ALWIN C., HOWELL, KATHER'NE, AND DENENHOLZ, EDWARD J., Pertussis-parapertussis vaccine, 556

RANDOLPH, THERON G., Allergy as a causative factor of fatigue, irritability, and behavior problems of children, 560

RAVICH, ROBERT M., AND ROSENBLATT, PHILIP, Myocardial infarction in the newborn infant, 266

RICHMOND, JULIUS B., AND MOORE, HERBERT R., Abdominal abscess as a cause of intestinal obstruction in the newborn infant, 343

ROBINSON, JOSEPH (WITH STERNBACH, ALBERT), Sclerema adiposum neonatorum, 465

ROHRET, CECELIA HEALY (WITH JACKSON, ROBERT L., KELLY, HELEN G., AND DUANE, JULIA M.), Rheumatic fever recurrences in children without sulfonamide prophylaxis: An evaluation of environmental factors, 390

ROSENBLATT, PHILIP (WITH RAVICH, ROBERT M.), Myocardial infarction in the newborn infant, 266

ROSS, SIDNEY (WITH TICHENOR, CLIFFORD J., AND MCLENDON, PRESTON A.), Rocky Mountain spotted fever: A preliminary report on the use of para-aminobenzoic acid, 1

S

SALMON, GEORGE W., AND BARKLEY, HOWARD T., The Blalock-Taussig operation, 54

—, (WITH FORBES, GILBERT B., AND HERWEG, JOHN C.), Further observations on post-tracheotomy, mediastinal emphysema, and pneumothorax, 172

DE SANT' AGNESE, PAUL A., Combined immunization against diphtheria, tetanus, and pertussis in children over three months of age, including an evaluation of the effectiveness of two immunizing agents, 251

SCHOUR, ISAAC (WITH MASSLER, MAURY), Dental caries experience in postwar Italy (1945). II. Among teen-age children in Naples, 431

SIEGFRIED, DOROTHY A. (WITH MAN, EVELYN B., CULOTTA, CHARLES S., AND STILSON, CARTER), Serum precipitable iodines in recognition of cretinism and in control of thyroid medication, 154

SILVER, HENRY K., Wilms' tumor (embryoma of kidney), 643

SIMMONS, DONALD R., AND PEYTON, WILLIAM T., Premature closure of the cranial sutures, 528

SLOBODY, LAWRENCE B., BENSON, REUEL A., AND MESTERN, JOAN, A comparison of vitamin C in mothers and their premature newborn infants, 333

—, (WITH BENSON, REUEL A., LILLICK, LOIS, MAFFIA, ANTHONY, AND SULLIVAN, NORBERT), A new treatment for diaper rash, 369

SLOTOWSKI, EUGENE L., AND BOROVSKY, MAXWELL P., Adenoleiomyofibroma of the tongue, 470

SMITH, RICHARD M., Letter on the Taft bill, 476

SPIES, TOM D. (WITH MANN, ARVIN W., AND DREIZEN, SAMUEL), The determination of status and progress in children with nutritive failure, 161

SPOHN, PETER H., AND STATTEN, TAYLOR, Method of holding the head for scalp vein transfusions and restraining the legs for intravenous therapy, 207

STADLER, HAROLD E., Ectromelia and associated development defects, 691

STATTEN, TAYLOR (WITH SPOHN, PETER H.), Method of holding the head for scalp vein transfusions and restraining the legs for intravenous therapy, 207

STERNBACH, ALBERT, AND ROBINSON, JOSEPH, Sclerema adiposum neonatorum, 465

STEVENSON, STUART SHELTON, The adequacy of artificial feeding in infancy, 616

STILSON, CARTER (WITH MAN, EVELYN B., CULOTTA, CHARLES S., AND SIEGFRIED, DOROTHY A.), Serum precipitable iodines in recognition of cretinism and in control of thyroid medication, 154

STIMSON, PHILIP M., The treatment of acute poliomyelitis together with some suggestions on diagnosis, 82

SULLIVAN, NORBERT (WITH BENSON, REUEL A., SLOBODY, LAWRENCE B., LILLICK, LOIS, AND MAFFIA, ANTHONY), A new treatment for diaper rash, 369

SWILLER, A. IRVING (WITH SWILLER, HELEN E., AND TRAUB, FREDERICK B.), *Salmonella* carrier treated successfully with streptomycin, 474

infants were normal, one was an abortion, and one was defective, an incidence of 40 per cent lost or defective. Statistics in this epidemic on the remaining months of pregnancy revealed the following: one minor defect in the sixth month, two stillbirths, seventh and eighth months respectively, one defective infant where the month of pregnancy at which infection occurred was not known. Thus, in the fifty-four cases, there were eight defective infants and nine pregnancies which terminated in an abortion or stillbirth.

The authors refer to similar studies made by Fox and Bortin[6] and Aycock and Ingalls.[7] Stress is laid on the fact that "with the exception of Aycock and Ingalls, no previous authors have emphasized that abortions and stillbirths may result from infection of pregnant women with rubella," and that in their present survey the number of abortions and stillbirths uncovered was as large as the number of defective children. The need for further surveys is emphasized and particularly the need for comparisons made between the incidence of congenital abnormalities where pregnancy is not complicated by communicable disease and that noted where the pregnancy has been complicated by virus or bacterial disease.

The role of communicable disease in mongolism was discussed recently in a comprehensive article by Ingalls,[3] who presents data in support of the conception that mongolism originates between the sixth and ninth weeks of fetal life. According to Ingalls, the causative agents include hemorrhage, threatened abortion, pathologic abnormalities of the uterus, and certain intercurrent infections. The last category is of special interest. Ingalls and Davies[8] have reported seven instances of acute intercurrent infections observed during pregnancy which terminated in the delivery of a mongoloid infant. In six of the seven cases the particular disease occurred toward the end of the second month of gestation; one case of rubella in the first trimester of pregnancy was associated with the birth of a mongoloid child. Two additional instances of mongolism associated with maternal rubella in early pregnancy are cited by these authors, one in which rubella occurred during the third month and the other known to have occurred during the first trimester of pregnancy. In an evaluation of these data, Ingalls[3] concludes that on the basis of epidemiologic probability, "it is unlikely for the observed combination of three cases of rubella and mongolism to occur by chance."

Such critical surveys may bring about a fuller understanding of the prenatal factors which are involved in fetal maldevelopment, and may lead to a more effective control of some of these factors with consequent improvement in the hygienic protection of the developing individual.

RUSSELL J. BLATTNER.

REFERENCES

1. Stockard, C. R.: Am. J. Obst. 59: 582, 1909. Quoted by Ingalls; see (3).
2. Gregg, N. McA.: Congenital Cataract Following German Measles in the Mother, Tr. Ophth. Soc. Aust. 3: 35, 1941.
3. Ingalls, Theo. H.: Etiology of Mongolism: Epidemiologic and Teratologic Implications, Am. J. Dis. Child. 74: 147, 1947.
4. Cordes, F. C., and Barber, A.: Changes in the Lens of the Embryo After Rubella; Microscopic Examination of Eight-Week-Old Embryo, Arch. Ophth. 36: 135, 1946. Quoted by Ingalls; see (3).
5. Ober, R. E., Horton, R. J. M., and Feemster, R. F.: Congenital Defects in a Year of Epidemic Rubella, Am. J. Pub. Health 37: 1328, 1947.
6. Fox, M. J., and Bortin, M. M.: Rubella in Pregnancy Causing Malformations in the Newborn, J. A. M. A. 130: 568, 1946.
7. Aycock, W. L., and Ingalls, T. H.: Maternal Disease as a Principle in the Epidemiology of Congenital Anomalies, Am. J. M. Sc. 212: 366, 1946.
8. Ingalls, T. H., and Davies, J. A. V.: Mongolism Following Intercurrent Infectious Disease in Pregnancy, New Eng. J. Med. 236: 437, 1947.

SUBJECT INDEX*

A

Abdominal abscess as cause of intestinal obstruction in newborn infant (Richmond and Moore), 343
wall, congenital desmoid of (Brockman), 217
Abscess, abdominal, as cause of intestinal obstruction in newborn infant (Richmond and Moore), 343
Acidosis, diabetic, treatment of (Hartmann and Erganian), 274
nondiabetic ketone (Hartmann and Erganian), 296
Adenoleiomyofibroma of tongue (Slotowski and Borovsky), 470
Adrenogenital syndrome, sex precocity and (Bergman), 142
Agglutinogen B, iso-immunization with, congenital hemolytic anemia of the newborn caused by (Nathan, et al.), 683
Alhydrox: combined immunization against diphtheria, tetanus, and pertussis in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Angnese), 251
Allergy as causative factor of fatigue, irritability, and behavior problems of children (Randolph), 560
Anemia, congenital hemolytic, of newborn, caused by iso-immunization with agglutinogen B (Nathan, et al.), 683
Cooley's erythroblastic, in two Chinese boys (Gardner), 347
Anuria, prolonged, following single injection of bismuth preparation (Petersilge), 580
Appetite, poor, in young children (Bakwin), 584
Arachnodactylia (Dorrance), 679

B

Bile duct, common, idiopathic dilatation of, in childhood (Kelsey), 211
Bismuth preparation, prolonged anuria following single injection of (Petersilge), 580
Blalock-Taussig operation (Salmon and Barkley), 54
Blood, effect of trimethyloxazolidine dione (Tridione) on (Davis and Lennox), 24
Blood—Cont'd
volume in congenital heart disease (Cassels and Morse), 485
Book Reviews:
Child and adolescent life in health and disease (Craig), 247
Feeding and care of baby (King), 481
Hospital care in the United States (Commission on Hospital Care, 1947), 713
Let's talk about your baby (Tenney), 713
Manual of common contagious diseases (Stimson), 127
Medicine in the changing order. Report of the New York Academy of Medicine committee on medicine and the changing order, 365
1946 year book of endocrinology, metabolism, and nutrition (Thompson and Spies, ed.), 596
Year book of pediatrics (Abt. ed.), 596
Nutrition and vitamin therapy in general practice (Gordon), 596
Personality of the preschool child (Wolf), 247
Pharmacopoeia of the United States of America, 127
Psychiatric interviews with children (Whitmer), 127
Rocky Mountain conference on infantile paralysis, 596
Science and seizures (Lennox), 596
Sex education. A guide for parents, teachers, and youth leaders (Bibby), 128
Breast feeding, some factors which influence the duration of (Norval), 415

C

Carbaminoylcholine (Doryl) in treatment of congenital megacolon (Greenblatt), 687
Cerebral abscess: a complication of congenital cardiac disease (Fallot's tetralogy) (Hand), 662
Child welfare in Britain (Moncrieff), 477
Children's hospital, psychiatric services in (Szurek), 338
Cholecystitis and cholelithiasis in congenital diverticulum of gall bladder in three-year-old boy (Bogatko and Mehlman), 75
Cholelithiasis and cholecystitis in congenital diverticulum of gall bladder in three-year old boy (Bogatko and Mehlman), 75

*July, pp. 1-130; August, pp. 131-250; September, pp. 251-368; October, pp. 369-484; November, pp. 485-598; December, pp. 599-724.

Book Reviews

Hospital Care in the United States. Commission on Hospital Care, 1947. New York. The Commonwealth Fund. pp. 631. Price $4.50.

The Commission on Hospital Care was established in the fall of 1944 with President Thomas S. Gates of the University of Pennsylvania as chairman. Included in the twenty members of the Commission were physicians, hospital administrators, and representatives of the public, such as Herbert Hoover. Dr. A. C. Bachmeyer was director of the study staff. The work of the Commission was financed by grants from the Foundation.

The report summarizes an intensive survey of the hospitals in the United States in which it was assisted in the field work by the U. S. Public Health Service. The Commission has inaugurated hospital surveys in every state which are now under way, and selected Michigan for a pilot study. A detailed report of the Michigan survey is included in this report.

In all, the Commission makes 181 specific recommendations which are discussed in the report. These involve every phase of the hospital, as needs, organization, administration, education, nursing, medical staff. Obviously a review cannot discuss these 181 recommendations in detail. Based on its Michigan survey, the Commission finds a need for 195,000 additional general hospital beds in the United States, and finds that some 25 per cent of existing beds are outmoded. At present prices it would cost something like $1,800,000,000 for this construction. It recommends that there should be fewer hospitals than at present but larger hospitals. The responsibility of the hospital to the community should be extended to include preventive medicine and health education. Group practice with the hospital as a center should be extended where locally possible. There is need for much more integration of services and facilities among the hospitals. Facilities for the care of communicable diseases, including pulmonary tuberculosis, should be provided in the general hospital. Closer relationship should be established between the hospital and departments of public health. These are but a few of the recommendations, but they illustrate the broad viewpoint of the discussion and report. Section seven of the report devotes nearly 100 pages to an interesting history of hospitals in the United States.

In view of the widespread increased use of hospitals which has taken place in recent years, and the overcrowding that exists, together with the present enactment of federal legislation for the development of increased hospital facilities, the report is not only timely but of universal interest and importance.

B. S. V.

Let's Talk About Your Baby. H. Kent Tenney, Jr., M.D., ed. 3, Minneapolis, 1947, The University of Minnesota Press. Price $1.50.

This is one of the best and easily the most unique book on infant care for parents that has been published. It can be recommended safely by the physician, and because of the method of presentation of the advice, its educational value for the laity is greater than that of the usual, more formulized texts. Only a few changes have been made in the new edition from the previous text.

G

Gall bladder, cholecystitis and cholelithiasis in congenital diverticulum of, in three year old boy (Bogatko and Mehlman), 75
Gargoylism (Lipochondrodystrophy) (Lahey, et al.), 220
Group health cooperative of Puget Sound (MacColl), 119

H

Health insurance, submission respecting (Canadian Medical Association), 228
Heart disease congenital, blood volume in (Cassels and Morse), 485
cerebral abscess a complication of Fallot's tetralogy (Hand), 662
Hemihypertrophy, congenital, review of subject and complete case report (Ward and Lerner), 403
Hepatitis, homologous serum, following transfusion in infant (Bruyn), 60
Herniated ovary in infant (Duren and Frank), 227
Homologous serum hepatitis following transfusion in infant (Bruyn), 60
Hospital care in the United States (Commission on hospital care, 1947), 713 (B rev.)
children's psychiatric services in (Szurek), 338
Hypersensitivity to privine (Greenblatt), 355

I

Idiopathic dilatation of common bile duct in childhood (Kelsey), 211
Immunization, combined, against diphtheria, tetanus, and pertussis in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Agnese), 251
Impetigo neonatorum congenita (Gilner and Nelson), 213
Indulgence and feeding, self demand, in early infancy (Weinfeld), 203
Infancy, adequacy of artificial feeding in (Stevenson), 616
self demand feeding and indulgence in (Weinfeld), 203
Infant, breast feeding, some factors which influence the duration of (Norval), 415
feeding and care of baby (King), 481 (B rev.)
homologous serum hepatitis following transfusion in (Bruyn), 60
newborn, myocardial infarction in (Ravich and Rosenblatt), 266
premature, comparison of vitamin C in mothers and (Slobody, et al.), 333
rooming in arrangement for the, in small hospital (Barnett), 49
Infarction, myocardial, in newborn infant (Ravich and Rosenblatt), 266
Insect borne diseases in South Pacific campaign, observations on (Harper), 631
Institutionalized children, incidence of caries among, II epidemiologic studies in dental caries (Boyd and Cheyne), 306
Insulin, Ringer's solution, and sodium lactate in treatment of diabetic acidosis (Hartmann and Erganian), 276
Interviews, psychiatric, with children (Whitmer), 127 (B. rev.)
Intestinal obstruction, abdominal abscess as cause of, in newborn infant (Richmond and Moore), 343
Intravenous therapy, method of restraining legs for, and holding head for (Spohn and Statten), 207
Iodine, serum precipitable, in recognition of cretinism and in control of thyroid medication (Man, et al.), 154
Irritability, fatigue, and behavior problems of children, allergy as causative factor of (Randolph), 560

K

Ketone acidosis, nondiabetic (Hartmann and Erganian), 296
Kidney, embryoma of, Wilms' tumor (Silver), 643

L

Language disabilities, specific, primary etiology of (Eustis), 448
Legs, restraining, for intravenous therapy, and holding head for scalp vein transfusions (Spohn and Statten), 207
Lipochondriodystrophy (gargoylism), Lahey, et al.), 220
Liver, portal cirrhosis of (Block), 420

M

Meatus, ulcerated urethral, in male children (Freud), 131
Mediastinal emphysema, post tracheotomy, and pneumothorax (Forbes, et al.), 172
Medical organization in New Zealand (Lewis), 587
Megacolon, congenital, carbaminoylcholine (Doryl) in treatment of (Greenblatt), 687
Meningoencephalitis, mumps, clinical picture of, and report of case without parotitis (Eberlein and Lynnwiler), 513
Metabolism, 1946 year book of endocrinology, nutrition, and (Thompson and Spies, ed.), 596 (B rev.)
Miliary tuberculosis, streptomycin in treatment of (Cobley and Goettsch), 70
Mothers and their premature newborn infants, comparison of vitamin C in (Slobody, et al.), 333

THE JOURNAL
OF
PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE PROBLEMS AND DISEASES OF INFANCY AND CHILDHOOD

BORDEN S. VEEDER
St. Louis
Editor

VOLUME 31
JUNE—DECEMBER, 1947

ST. LOUIS
THE C. V. MOSBY COMPANY
1947

Self-demand feeding and indulgence in early infancy (Weinfeld), 203
Serum hepatitis, homologous, following transfusion in infant (Bruyn), 60
precipitable iodines in recognition of cretinism and in control of thyroid medication (Man, et al.), 154
Sex education: a guide for parents, teachers, and youth leaders (Bibby), 128 (B. rev.)
precocity and adrenogenital syndrome (Bergman), 142
Social Aspects of Medicine:
Atwater, R. M., testimony on Senate Bill 545, 361
child welfare in Britain (Moncrieff), 477
group health cooperative of Puget Sound (*MacColl*), 119
medical organization in New Zealand (Lewis), 587
now is the time (Noehren), 704
open letter to Dr. Palma (White), 118
Palma, Joseph, further letter on his Statement, 357
Smith, Richard M., letter on Taft Bill, 476
social aspects of medicine: a statement (Palma), 117
submission respecting health insurance (Canadian Medical Association), 228
White, Park J., communication, 709
Wilson, James L., letter on Joseph Palma statement (p. 117), 357
Sodium lactate in treatment of diabetic acidosis (Hartmann and Erganian), 294
sulfadiazine, subcutaneous administration of (Forbes, et al.), 375
Speech defects, specific language disabilities, primary etiology of (Eustis), 448
Streptomycin, salmonella carrier treated successfully with (Swiller, et al.), 474
in treatment of miliary tuberculosis (Cobley and Goettsch), 70
Stuttering, a reorientation (Missildine and Glasner), 300
Sulfadiazine, sodium, subcutaneous administration of (Forbes, et al.), 375
Sydenham's chorea, syndrome for differential diagnosis (Kagan and Mirman), 322
Synostosis, congenital humeroradial, with other synostotic anomalies (Lambert), 573

T

Tetanus, diphtheria, and pertussis, combined immunization against, in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Agnese), 251
Tetralogy of Fallot: cerebral abscess a complication of congenital cardiac disease (Hand), 662
Thyroid medication, serum precipitable iodines in control of, and in recognition of cretinism (Man, et al.), 154
Tongue, adenolciomyofibroma of (Slotowski and Borovsky), 470
Toxoids, fluid diphtheria and tetanus, and aluminum hydroxide-absorbed diphtheria and tetanus: combined immunization against diphtheria, tetanus, and pertussis in children over three months of age (di Sant' Agnese), 251
Transfusion in infant, homologous serum hepatitis following (Bruyn), 60
scalp vein, method of holding head for, and restraining legs for intravenous therapy (*Spohn and Statten*), 207
Tridione (trimethyloxazolidine dione), effect of, on blood (Davis and Lennox), 24
Trimethyloxazolidine dione (Tridione), effect of, on blood (Davis and Lennox), 24
Tuberculosis, miliary, streptomycin in treatment of (Cobley and Goettsch), 70
Tumor, Wilms' (embryoma of kidney) (Silver), 643

U

Urethral meatus, ulcerated, in male children (Freud), 131

V

Vaccine, DPT, combined immunization against diphtheria, tetanus, and pertussis in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Agnese), 251
pertussis-paratussis (Rambar, et al.), 556
Vitamin A, *comparative absorption*, excretion, and storage of oily and aqueous preparations of (Lewis, et al.), 496
C, comparison in mothers and their premature newborn infants (Slobody, et al.), 333
therapy, nutrition and, in general practice (Gordon), 596 (B. rev.)

W

Whooping cough:
combined immunization against pertussis, diphtheria, and tetanus in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Agnese), 251
pertussis-parapertussis vaccine (Rambar, et al.), 556
Wilms' Tumor (embryoma of kidney) (Silver), 643

INDEX TO VOLUME 31

AUTHORS INDEX*

A

AMSTERDAM, SOL DARRELL (WITH MALINER, MARTIN M.), Oral penicillin in the prophylaxis of recurrent rheumatic fever, 658

ATWATER, R. M., Testimony on behalf of the American Public Health Association on Senate Bill 545, 361

B

BAKWIN, HARRY, Glutamic acid and mental functioning, 702

—, Poor appetite in young children, 584

BARKLEY, HOWARD T. (WITH SALMON, GEORGE W.), The Blalock-Taussig operation, 54

BARNETT, HENRY L., A note on experiences with a rooming-in arrangement for newborn infants in a small hospital, 49

BENSON, REUEL A., SLOBODY, LAWRENCE B., LILLICK, LOIS, MAFFIA, ANTHONY, AND SULLIVAN, NORBERT, A new treatment for diaper rash, 369

—, (WITH SLOBODY, LAWRENCE B., AND MESTERN, JOAN), A comparison of vitamin C in mothers and their newborn infants, 333

BERGMAN, BEATRICE, Sex precocity and the adrenogenital syndrome, 142

BIRMINGHAM, J. (WITH LEWIS, J. M. BODANSKY, O., AND COHLAN S. Q.), Comparative absorption, excretion, and storage of oily and aqueous preparations of vitamin A, 496

BLATT, MAURICE L., PLATTNER, EDWARD B., LEVINE, MILTON, AND MELZER, FRANRESKA, Phthalylsulfathiazole in the treatment of diarrhea in children, 548

BLATTNER, RUSSELL J., Infectious disease in pregnancy and fetal development, 710

—, The role of flies in poliomyelitis, 593

BLOCK, WALTER M., Portal cirrhosis of the liver, 420

BODANSKY, O. (WITH LEWIS, J. M. BIRMINGHAM, J., AND COHLAN, S. Q.), Comparative absorption, excretion, and storage of oily and aqueous preparations of vitamin A, 496

BOGATKO, FRANCES H., AND MEHLMAN, JULIA, Cholecystitis and cholelithiasis in a congenital diverticulum of the gall bladder in a three-year-old boy, 75

BOROVSKY, MAXWELL P. (WITH SLOTOWSKI, EUGENE L.), Adenoleiomyofibroma of the tongue, 470

BOYD, JULIAN D., AND CHEYNE, VIRGIL D., Epidemiologic studies in dental caries. II. The incidence of caries among institutionalized children, 306

BRADLEY, ELIZABETH J., Periarteritis nodosa in childhood, 78

BRIDGE, EDWARD M. (WITH LIVINGSTON, SAMUEL, AND KAJDI, LASLO), Febrile convulsions: A clinical study with special reference to heredity and prognosis, 509

BROCKMAN, DAVID DEAN, Congenital desmoid of the abdominal wall, 217

BRUYN, HENRY B., Homologous serum hepatitis following transfusion in an infant, 60

BUNCH, ROLIN F. (WITH MCCRORY, WALLACE W.), Omphalocele with diaphragmatic defect and herniation of the liver into the pericardial cavity, 456

C

CASSELS, DONALD E., AND MORSE, MINERVA, Blood volume in congenital heart disease, 485

CHEYNE, VIRGIL (WITH BOYD, JULIAN D), Epidemiologic studies in dental caries. II. The incidence of caries among institutionalized children, 306

COBLEY, GEORGE, AND GOETTSCH, ELVIRA, Streptomycin in the treatment of miliary tuberculosis, 70

COHLAN, S. Q. (WITH LEWIS, J. M., BODANSKY, O., AND BIRMINGHAM, J.), Comparative absorption, excretion, and storage of oily and aqueous preparations of vitamin A, 496

CULOTTA, CHARLES S. (WITH MAN, EVELYN B., SIEGFRIED, DOROTHY A., AND STILSON, CARTER), Serum precipitable iodines in recognition of cretinism and in control of thyroid medication, 154

D

DAVIS, JEAN P., AND LENNOX, WILLIAM G., The effect of trimethyloxazolidine dione (Tridione) on the blood, 24

*July, pp. 1-130; August, pp. 131-250; September, pp. 251-368; October, pp. 369-484; November, pp. 485-598; December, pp. 599-724.

Articles to appear in early issues of

The JOURNAL OF PEDIATRICS

:YTHROBLASTOSIS FETALIS IN A PREMATURE INFANT FROM A MOTHER WITH SICKLE CELL ANEMIA.
By William J. Doyle, M.D., and David Annunziata, M.D., Brooklyn, N. Y.

:RTHER STUDIES ON NITROGEN AND FAT METABOLISM IN INFANTS AND CHILDREN WITH FIBROSIS OF THE PANCREAS.
By Alfred T. Shohl, M.D.

IE HEART IN NORMAL INFANTS AND CHILDREN.
By Nathan Epstein, M.D., New York, N. Y.

EGALOBLASTIC ANEMIA IN INFANCY.
By B. J. Siebenthal, M.D., South Bend, Ind.

IE TREATMENT OF PERTUSSIS AND PNEUMONIA COMPLICATING PERTUSSIS.
By Henry Brainerd, M.D., San Francisco, Calif.

ATURAL INCIDENCE OF INFLUENZA ANTIBODIES IN CHILDREN OF DIFFERENT AGE GROUPS.
By Philip Cohen, M.D., and Herman Schneck, M.D., New York, N. Y.

FFECT OF INFLUENZA VIRUS VACCINATION IN INFANTS AND CHILDREN, WITH ANTIBODY STUDIES.
By Philip Cohen, M.D., and Herman Schneck, M.D., New York, N. Y.

LOMERULAR FILTRATION RATE, EFFECTIVE RENAL BLOOD FLOW, AND MAXIMAL TUBULAR EXCRETORY CAPACITY IN INFANCY.
By Joseph R. West, M.D., Homer W. Smith, Sc.D., and Homer Chasis, M.D., New York, N. Y.

EMANGIOMA OF THE LIVER CAUSING DEATH IN A NEWBORN INFANT.
By J. G. Hendrick, M.D., Memphis, Tenn.

N UNUSUAL ERUPTIVE FEVER INVOLVING THE SKIN AND MUCOUS MEMBRANES.
By Paul A. Bradlow, M.D., and Robert A. Schless, M.D., Philadelphia, Pa.

LOOD CHEMICAL AND IMMUNOLOGIC EFFECTS OF ADRENAL CORTICAL EXTRACT IN CHILDREN.
By Vincent C. Kelley, M.D., and John M. Adams, M.D., Minneapolis, Minn.

ORSION OF THE APPENDIX TESTIS.
By William M. Coppridge, M.D., and Louis C. Roberts, M.D., Durham, N. C.

O ERYTHROBLASTOTIC NEWBORN INFANTS DESTROY RH-NEGATIVE RED BLOOD CELLS?
By Edwin L. Kendig, Jr., M.D., Richmond, Va.

HE TREATMENT OF ACUTE RESPIRATORY INFECTIONS IN CHILDREN WITH ORALLY ADMINISTERED, UNBUFFERED PENICILLIN SOLUTIONS.
By William S. Hoffman, Ph.D., M.D., Jesse W. Hofer, Ph.D., M.D., and Hyman Gordon, M.D., Chicago, Ill.

'HYSICAL GROWTH OF CHINESE INFANTS.
By Shan-yah Gin, M.D., Shanghai, China.

EPTICEMIA DUE TO ESCHERICHIA COLI. REPORTS OF TWO CASES.
By R. David Daniel, M.D., Boston, Mass., and Katherine Anderson, M.D., Winston-Salem, N. C.

'ETECHIAE IN CHILDREN: INCIDENCE, SEASONAL VARIATIONS, AND ETIOLOGY.
By Edward E. Brown, M.D., Ashland, Ore.

'HRONIC LYMPHOID LEUCEMIA IN CHILDREN.
By Jean Holowach, M.D., St. Louis, Mo.

ADJUSTMENT OF PARENTS TO CHILDREN IN THE HOME.
By Sidney Berman, M.D., Washington, D. C.

LAMBERT, LESLIE A., Congenital humeroradial synostosis with other synostotic anomalies, 573
LENNOX, WILLIAM G. (WITH DAVIS, JEAN P.), The effect of trimethyloxazolidine dione (Tridione) on the blood, 24
LERNER, HENRY H. (WITH WARD, JOHN), A review of the subject of congenital hemihypertrophy and a complete case report, 403
LEVINE, MILTON (WITH BLATT, MAURICE L., PLATTNER, EDWARD B., AND MELZER, FRANRESKA), Phthalylsulfathiazole in the treatment of diarrhea in children, 548
LEWIS, J. M., BODANSKY O., BIRMINGHAM, J., AND COHLAN, S. Q., Comparative absorption, excretion, and storage of oily and aqueous preparations of vitamin A, 496
LEWIS, ROGER A., Medical organization in New Zealand, 587
LILLICK, LOIS (WITH BENSON, REUEL A., SLOBODY, LAWRENCE B., MAFFIA, ANTHONY, AND SULLIVAN, NORBERT), A new treatment for diaper rash, 369
LIVINGSTON, SAMUEL, BRIDGE, EDWARD M., AND KAJDI, LASLO, Febrile convulsions: A clinical study with special reference to heredity and prognosis, 509
LOMAS, R. D. (WITH LAHEY, M. E., AND WORTH, T. C.), Lipochondrodystrophy (gargoylism), 220
LYNNWILER, CHESTER P. (WITH EBERLEIN, WALTER R.), The clinical picture of mumps meningoencephalitis and report of a case without parotitis, 513

M

MACCOLL, WILLIAM A., The group health cooperative of Puget Sound, 119
MCCRORY, WALLACE W., AND BUNCH, ROLIN F., Omphalocele with diaphragmatic defect and herniation of the liver into the pericardial cavity, 456
MCLENDON, PRESTON A. (WITH TICHENOR, CLIFFORD J., AND ROSS, SIDNEY), Rocky Mountain spotted fever: a preliminary report on the use of para-aminobenzoic acid, 1
MAFFIA, ANTHONY (WITH BENSON, REUEL A., SLOBODY, LAWRENCE B., LILLICK, LOIS, AND SULLIVAN, NORBERT), A new treatment for diaper rash, 369
MALINER, MARTIN M., AND AMSTERDAM, SOL DARRELL, Oral penicillin in the prophylaxis of recurrent rheumatic fever, 658
MAN, EVELYN B., CULOTTA, CHARLES S., SIEGFRIED, DOROTHY A., AND STILSON, CARTER, Serum precipitable iodines in recognition of cretinism and in control of thyroid medication, 154
MANN, ARVIN W., DREIZEN, SAMUEL, AND SPIES, TOM D., The determination of status and progress in children with nutritive failure, 161
MARKOWITZ, MILTON, AND KUTTNER, ANN G., A study of the absorption and excretion of oral penicillin in children, 195
MASSLER, MAURY, AND SCHOUR, ISAAC, Dental caries experience in postwar Italy (1945). II. Among teen-age children in Naples, 431
MEHLMAN, JULIA (WITH BOGATKO, FRANCES H.), Cholecystitis and cholelithiasis in a congenital diverticulum of the gall bladder in a three-year-old boy, 75
MELZER, FRANRESKA (WITH BLATT, MAURICE L., PLATTNER, EDWARD B., AND LEVINE, MILTON), Phthalylsulfathiazole in the treatment of diarrhea in children, 548
MESTERN, JOAN (WITH SLOBODY, LAWRENCE B., AND BENSON, REUEL A.), A comparison of vitamin C in mothers and their premature newborn infants, 333
MEYER, EDITH, Psychological considerations in a group of children with poliomyelitis, 34
MILLER, BERTRAM W., ORRIS, HARRY W., AND TAUS, HAROLD H., Friedländer's pneumonia in infancy, 521
MIRMAN, B. (WITH KAGAN, B. M.), Sydenham's chorea, a syndrome for differential diagnosis, 322
MISSILDINE, W. HUGH, AND GLASNER, PHILIP J., Stuttering, a reorientation, 300
MONCRIEFF, ALAN, Child welfare in Britain, 477
MOORE, HERBERT R. (WITH RICHMOND, JULIUS B.), Abdominal abscess as a cause of intestinal obstruction in the newborn infant, 343
MORSE, MINERVA (WITH CASSELS, DONALD E.), Blood volume in congenital heart disease, 485

N

NATHAN, ABRAHAM, GREEN, FREDERICK C., AND WEISS, GEORGE, Congenital hemolytic anemia of the newborn caused by isoimmunization with agglutinogen B, 683
NELSON, IRVING (WITH GILNER, ABRAHAM), Impetigo neonatorum congenita, 213
NOLTING, WILFRED S. (WITH WOOLLEY, PAUL V., JR., AND DUFFY, CARL E.), Rabies, 440
NORVAL, MILDRED A., Some factors which influence the duration of breast feeding, 415

O

ORRIS, HARRY W. (WITH MILLER, BERTRAM W., AND TAUS, HAROLD H.), Friedländer's pneumonia in infancy, 521

Anal Dilatation often Helpful in Pediatrics

Young's RECTAL DILATORS

Many pediatricians secure remarkable results through anal dilatation in constipation, especially in children with an atonic colon in association with a tight or spastic anal sphincter.



YOUNG'S RECTAL DILATORS are sold on prescription only, not advertised to the laity. Obtainable from your surgical supply house or ethical drugstore. Bakelite, 4 graduated sizes. Children's set $4.50, adult $4.75. Write for brochure.

F. E. YOUNG & COMPANY 434 E. 75th St., Chicago 19, Ill.



"Please!"

Join the MARCH OF DIMES

JANUARY 15-30

FIGHT INFANTILE PARALYSIS

THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

FRANKLIN D. ROOSEVELT, FOUNDER

SWILLER, HELEN E., SWILLER, A. IRVING, AND TRAUB, FREDERICK B., Salmonella carrier treated successfully with streptomycin, 474
SZUREK, S. A., Psychiatric services in a children's hospital, 338

T

TAUS, HAROLD H. (WITH MILLER, BERTRAM W., AND ORRIS, HARRY W.), Friedländer's pneumonia in infancy, 521
TICHENOR, CLIFFORD J., ROSS, SIDNEY, AND MCLENDON, PRESTON A., Rocky Mountain spotted fever: A preliminary report on the use of para-aminobenzoic acid, 1
TRAUB, FREDERICK B. (WITH SWILLER, A. IRVING, AND SWILLER, HELEN E.), Salmonella carrier treated successfully with streptomycin, 474

W

WARD, JOHN, AND LERNER, HENRY H., A review of the subject of congenital hemihypertrophy and a complete case report, 403
WEINFELD, GUSTAVE F., Self-demand feeding and indulgence in early infancy, 203
WEISS, GEORGE (WITH NATHAN, ABRAHAM, AND GREEN, FREDERICK C.), Congenital hemolytic anemia of the newborn caused by iso-immunization with agglutinogen B, 683
WHITE, PARK J., Open letter to Dr. Palma, 118
WOOLLEY, PAUL V., JR. (WITH DUFFY, CARL E., AND NOLTING, WILFRED S.), Rabies, 440
WORTH, T. C. (WITH LAHEY, M. E., AND LOMAS, R. D.), Lipochondrodystrophy (gargoylism), 220



For once they actually agree!

Hope and Crosby, in the movies, seldom see eye to eye.

But there's one thing they really do agree on —they both think U.S. Savings Bonds make wonderful Christmas gifts!

SAYS BOB: "They're swell for *anybody* on your list. You couldn't pick a nicer, more sensible, more welcome present. Even Crosby knows that."

SAYS BING: "I hate to admit it, folks, but Hope is right. And remember this—you can buy Bonds at any bank or post office in the U. S. A."

BOB AND BING (together): "This Christmas, why not give the finest gift of all—U.S. Savings Bonds!"

Give the finest gift of all ....U.S. SAVINGS BONDS

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.

Chorea, Sydenham's, syndrome for differential diagnosis (Kagan and Mirman), 322
Cirrhosis, portal, of liver (Block), 426
Clinical Conferences:
Duke Hospital, Aug. 28, 1947: clinic on nephritis and nephrosis, 696
St. Louis Children's Hospital, May 23, 1947, 93
Comments on Current Literature:
infectious disease in pregnancy and fetal maldevelopment, 710
role of flies in poliomyelitis, 593
Congenital desmoid of abdominal wall (Brockman), 217
diverticulum of gall bladder, cholecystitis and cholelithiasis in, in three-year-old boy (Bogatko and Mehlman), 75
heart disease, blood volume in (Cassels and Morse), 485
hemihypertrophy, review of subject and complete case report (Ward and Lerner), 403
Contagious diseases, manual of common (Stimson), 127 (B. rev.)
Convulsions, febrile: clinical study with special reference to heredity and prognosis (Livingston, et al.), 509
Cranial sutures, premature closure of (Simmons and Peyton), 528
Cretinism, serum precipitable iodines in recognition of, and in control of thyroid medication (Man, et al.), 154

D

Dental caries, epidemiologic studies in, II. Incidence of caries among institutionalized children (Boyd and Cheyne), 306
experience in postwar Italy (1945) II. Among teen-age children in Naples (Massler and Schour), 431
Desmoid, congenital, of abdominal wall (Brockman), 217
Determination of status and progress in children with nutritive failure (Mann, et al.), 161
Diabetic acidosis, treatment of (Hartmann and Erganian), 274
Diaper rash, new treatment for (Benson, et al.), 369
Diarrhea, neonatal, peritonitis associated with (Doenges), 669
phthalylsulfathiazole in treatment of, in children (Blatt, et al.), 548
Dilatation, idiopathic, of common bile duct in childhood (Kelsey), 211
Diphtheria, tetanus, and pertussis, combined immunization against, in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Agnese), 251
Diseases, insect-borne, in South Pacific campaign, observations on (Harper), 631
Diverticulum, congenital, of gall bladder, cholecystitis and cholelithiasis in, in three-year-old boy (Bogatko and Mehlman), 75
Doryl (carbaminoylcholine) in treatment of congenital megacolon (Greenblatt), 687
DPT vaccine, combined immunization against diphtheria, tetanus, and pertussis in children over three months of age, including evaluation of effectiveness of two immunizing agents (di Sant' Agnese), 251

E

Ectromelia and associated development defects (Stadler), 691
Editor's Column:
the Canadian Medical Association and health insurance, 249
discrimination in medicine, 482
Dr. Park's centennial address, 714
the Fifth International Congress of Pediatrics, 250
influenza vaccination, 597
medical care and poliomyelitis, 714
on two new departments, 597
what do our readers want of the Journal? 129
Education, sex: guide for parents, teachers, and youth leaders (Bibby), 128 (B. rev.)
Embryoma of kidney, Wilms' tumor (Silver), 643
Emphysema, mediastinal, post-tracheotomy, and pneumothorax (Forbes, et al.), 172
Endocrinology; 1946 year book of nutrition, metabolism and (Thomson and Spies, ed.), 596 (B. rev.)
Epidemiologic studies in dental caries, II. Incidence of caries among institutionalized children (Boyd and Cheyne), 306
Erythroblastosis fetalis, delayed exhibition of, after eight normal pregnancies (Perry), 578

F

Fatigue, irritability, and behavior problems of children, allergy as causative factor of (Randolph), 560
Feeding, artificial, adequacy of, in infancy (Stevenson), 616
and care of baby (King), 481 (B. rev.)
self-demand, and indulgence in early infancy (Weinfeld), 203
Fever, Rocky Mountain spotted, preliminary report on use of para-aminobenzoic acid in (Tichenor and Ross), 1
Fifth International Congress of Pediatrics, report of meeting, 242
Flies, role of, in poliomyelitis (Blattner), 593
Friedländer's pneumonia in infancy (Miller, et al.), 521

THE JOURNAL OF PEDIATRICS

EDITOR

BORDEN S. VEEDER, M.D., 3720 Washington Blvd., St. Louis 8, Mo.

PUBLISHED BY THE C. V. MOSBY COMPANY, 3207 WASHINGTON BLVD.
ST. LOUIS 3, U. S. A.

Entered at the Post Office at St. Louis, Mo., as Second Class Matter.

Published Monthly, Subscriptions may begin at any time.

Editorial Communications

Original Communications.—Manuscripts for publication and correspondence relating to them should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo., U. S. A. Articles are accepted for publication upon the understanding that they are contributed solely to The Journal of Pediatrics.

Manuscripts should be typewritten on one side of the paper only, with double spacing, and liberal margins. References should be placed at the end of the article and should include, in the order given, name of author, journal, volume, page and year; e.g., Smith: J. Pediat. 1: 10, 1932. Journal abbreviations as used in the publications of the American Medical Association should be followed. Illustrations accompanying manuscripts should be numbered, provided with suitable legends, and marked on margin or back with author's name. Articles accepted for publication are subject to editorial revision.

Neither the editors nor the publishers accept responsibility for the views and statements of authors as published in their "Original Communications."

Illustrations.—A reasonable number of half-tone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editor for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered only in India ink, or black typewriter ribbon (when the typewriter is used), as ordinary blue ink or colors will not reproduce. Only good photographic prints or drawings should be supplied for half-tone work.

Books for Review.—Only such books as are considered of interest and value to subscribers will be reviewed, and no published acknowledgment of books received will be made. These should be sent to Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis 8, Mo.

Reprints.—Reprints of articles published among "Original Communications," must be ordered specifically, in separate communication to the publishers, The C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, U. S. A., who will send their schedule of prices. Individual reprints of an article must be obtained through the author.

Business Communications

Business Communications.—All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.

Subscription Rates.—Single copies, 75c. In the United States and other countries of the U. S. Postal Zone, $8.50 per year in advance. In Canada and other foreign countries $9.50.

Remittances.—Remittances for subscriptions should be made by check, draft, post-office or express money order, or registered letter, payable to the publishers, The C. V. Mosby Co.

Change of Address.—The publishers should be advised of change of subscriber's address about fifteen days before the date of issue, with both new and old addresses given.

Advertisements.—Only articles of known scientific value will be given space. Forms close tenth of month preceding date of issue. Advertising rates and page sizes on application.

Mumps meningoencephalitis, clinical picture of, and report of case without parotitis (Eberlein and Lynxwiler), 513
Myocardial infarction in newborn infant (Ravich and Rosenblatt), 266

N

Newborn infants:
abdominal abscess as cause of intestinal obstruction in (Richmond and Moore), 343
breast feeding, some factors which influence the duration of (Norval), 415
congenital hemolytic anemia of, caused by isoimmunization with agglutinogen B (Nathan, et al.), 683
impetigo neonatorum congenita (Gilner and Nelson), 213
Let's talk about your baby (Tenrey), 713 (B rev.)
peritonitis associated with neonatal diarrhea (Doenges), 669
rooming in arrangement for, in small hospital (Barnett), 49
sclerema adiposum neonatorum in (Sternbach and Robinson), 465
News and Notes, 124, 246, 364, 480, 595, 712
Nutrition and vitamin therapy in general practice (Gordon), 596 (B rev.)
1946 year book of endocrinology, metabolism, and nutrition (Thompson and Spies, ed.), 596 (B rev.)
Nutritive failure, status, and progress determination in children with (Mann, et al.), 161

O

Obstruction, intestinal, abdominal abscess as cause of, in newborn infant (Richmond and Moore), 343
Omphalocele with diaphragmatic defect and herniation of liver into pericardial cavity (McCrory and Bunch), 456
Ovary, herniated, in infant (Duren and Frank), 227

P

Para aminobenzoic acid in Rocky Mountain spotted fever, preliminary report on use of (Tichenor and Ross), 1
Parapertussis pertussis vaccine (Rambar, et al.), 556
Penicillin, oral, absorption and excretion of, in children (Markowitz and Kuttner), 195
in infants (Husson), 651
in prophylaxis of recurrent rheumatic fever (Maliner and Amsterdam), 658
Periarteritis nodosa in childhood (Bradley), 78
Peritonitis associated with neonatal diarrhea (Doenges), 669
Personality of preschool child (Wolf), 247 (B rev.)
Pertussis See Whooping Cough
Phthalylsulfathiazole in treatment of diarrhea in children (Blatt, et al.), 548
Pneumonia, Friedlander's in infancy (Miller, et al.), 521
Pneumothorax, mediastinal emphysema, post tracheotomy and (Forbes, et al.), 172
Poliomyelitis, acute, treatment of, together with suggestions on diagnosis (Stimson), 82
psychological considerations in group of children with (Meyer), 34
Rocky Mountain conference on infantile paralysis, 596 (B rev.)
role of flies in (Blattner), 593
Post tracheotomy, mediastinal emphysema, and pneumothorax (Forbes, et al.), 172
Precocity, sex, and the adrenogenital syndrome (Bergman), 142
Premature newborn infants, comparison of vitamin C in mothers and (Slobody, et al.), 333
Preschool child, personality of (Wolf), 247 (B. rev.)
Privine, hypersensitivity (Greenblatt), 355
Psychiatric interviews with children (Whitmer), 127 (B rev.)
services in children's hospital (Szurek), 338
Psychologic Aspects of Pediatrics:
glutamic acid and mental functioning, 702
poor appetite in young children, 584
Psychological considerations in group of children with poliomyelitis (Meyer), 34

R

Rabies (Duffy, et al.), 440
Rash, diaper, new treatment for (Benson, et al.), 369
Rheumatic fever recurrences in children without sulfonamide prophylaxis: an evaluation of environmental factors (Jackson, et al.), 390
penicillin in prophylaxis of (Maliner and Amsterdam), 658
Ringer's solution, insulin, and sodium lactate in treatment of diabetic acidosis (Hartmann and Erganian), 276
Rocky Mountain spotted fever, preliminary report on use of para aminobenzoic acid in (Tichenor and Ross), 1
Rooming in arrangement for newborn infants in small hospital, experiences with (Barnett), 49

S

Salmonella carrier treated successfully with streptomycin (Swiller, et al.), 474
Sclerema adiposum neonatorum (Sternbach and Robinson), 465
Seizures, science and (Lennox), 596 (B rev.)



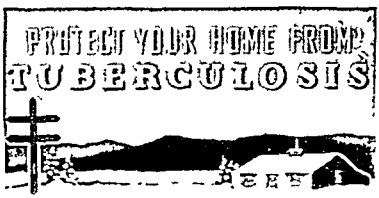
Lucky Day for Baby

Six-week-old Marc Bosniere sleeps peacefully while his mother, Mrs. Suzanne Bosniere, of Rueil, France, surveys the contents of a CARE layette package sent to the infant from an American donor. The $10 package brings oils, powders, bottles, diapers and other items impossible to obtain today in most sections of Europe. Like CARE's food, clothing, textile and other packages, the layette assortment can be sent by Americans to friends or relatives in Austria, Belgium, Bulgaria, Czechoslovakia, Finland, Hungary, Italy, Ireland (Eire), France, Greece, Netherlands, Poland, England, Scotland, Wales, Northern Ireland, Germany (American, British, French zones and all of Berlin). Delivery is guaranteed. When your order for a package is received by CARE, you get a receipt for your money. Your order is air mailed to the CARE representative in the country in which you wish your package delivered, and delivery is made from packages stocked in the warehouse in that section.

CARE

Cooperative for American Remittances to Europe, Inc.
50 Broad Street, New York 4, N. Y.
Paul Comly French, Executive Director

NON-PROFIT GOVERNMENT-APPROVED





Add Christmas Seals to your Christmas giving. Let Santa's every letter, every package carry the Seal that saves lives. Send in your contribution today.

Communicable Diseases

By FRANKLIN H. TOP, A.B., M.D., M.P.H., N.A.C.P., Medical Director, Herman Kiefer Hospital; Clinical Professor of Preventive Medicine and Public Health, Wayne University College of Medicine. 992 pages, 95 illustrations in the text and 13 Color Plates. Price, cloth, $8.50.

For the new edition of this outstanding volume, a complete revision has been made. All chapters have been reviewed and improved, many have been enlarged. Three chapters have been completely rewritten: Influenza, Malaria, and Rickettsial Diseases. Fourteen completely new chapters have been added. Twenty prominent authorities have collaborated with Dr. Top in this new edition.—**The C. V. Mosby Company—Publishers—St. Louis 3, Mo.**

Taking a Winter-Worry Off Your Mind

DURING the months when infants are, for the most part, confined indoors, the administration of vitamin D requires, of course, more than ordinary attention.

The best assurance that infants under your care will surely receive the amounts they need of this essential vitamin is to prescribe for them milk fortified with vitamin D, provided the potency is 400 units per quart of whole milk. Winter or summer, 400-unit vitamin D_3 milk assures the normal baby sufficient vitamin D for good bone and tooth development and for the best growth.

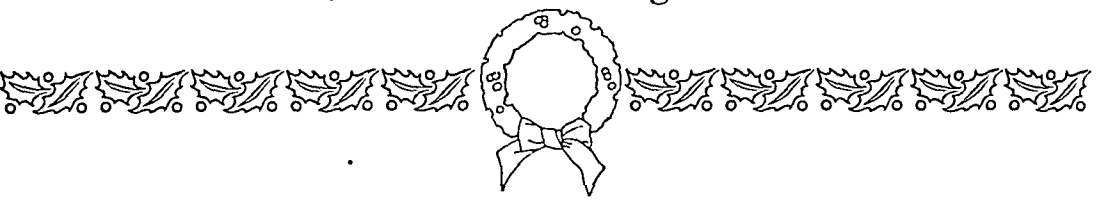
Pet Milk has this approved vitamin D potency, containing in each quart of whole milk, made by diluting Pet Milk with an equal part of water, 400 units of pure crystalline vitamin D_3. This new form of vitamin D is so pure, so effective that only 10 micrograms, an invisible amount, imperceptible in the infant's formula, provides the desired 400-unit potency.

The administration of vitamin D can be no more simple or sure than when the vitamin is furnished automatically in pure crystalline form and in sufficient amount for the normal baby, in an adequate ration of this milk that is completely safe and readily digestible and that costs less generally than any other form of milk.

PET MILK COMPANY, 1437-L Arcade Building
St. Louis 1, Missouri



"Of all the momentous and magnificent gifts to man, the BOOK is the greatest."—CARLYLE



At Christmas, as at no other time, our thoughts go out in happy remembrance to those whose associations we cherish. What more appropriate way for one man in medicine to say "Merry Christmas" to another, than with a Mosby Book?

Perhaps he hasn't had time to send for the one he wants—perhaps you are too busy to shop for those you would like to remember. Banish the thought! Your work is done for you cheerfully here at the Mosby Company. Just fill out the coupon below, and the best "Merry Christmas" you ever said will be sent wherever you say!



1947 RELEASES... *The latest thoughts make the newest gifts*

Ackerman and Regato's CANCER — Diagnosis, Treatment, Prognosis
1200 pages, 749 illustrations, 42 in color on 9 plates. $20.00

Clendening & Hashinger's METHODS OF DIAGNOSIS
1064 pages, 125 illustrations. $12.50

Eve's HANDBOOK OF FRACTURES
263 pages, 129 illustrations. $ 5.00

Jeans-Marriott's INFANT NUTRITION — 4th Edition
495 pages, 36 illustrations. $ 6.50

Johnstone's OCCUPATIONAL MEDICINE AND INDUSTRIAL HYGIENE
550 pages, 117 illustrations, 4 color plates. $10.00

McCormick's PATHOLOGY OF LABOR, THE PUERPERIUM AND THE NEWBORN — 2nd Edition
514 pages, 272 illustrations, 24 in color. $ 8.50

Rubin's UTEROTUBAL INSUFFLATION
453 pages, 159 illustrations, 4 in color. $10.00

Sadler's MENTAL MISCHIEF AND EMOTIONAL CONFLICTS
373 pages. $ 7.00

Scobee's THE OCULOROTARY MUSCLES
360 pages, 113 illustrations. $ 8.00

Top's COMMUNICABLE DISEASES—2nd Edition
992 pages, 95 illustrations, 13 color plates. $ 9.50

Treiger's ATLAS OF CARDIOVASCULAR DISEASES
117 pages, 244 illustrations, 11 in color. $10.00

Watson's HERNIA—3rd Edition
498 pages, 223 illustrations. $13.50

Wiener's SKIN MANIFESTATIONS OF INTERNAL DISEASES
680 pages, 400 illustrations, 6 color plates. $12.50

Important and Enduring Titles Make Appropriate and Acceptable Gifts

John's DIABETES—A Concise Presentation
300 pages, illustrated (1946). $3.25

Key and Conwell's FRACTURES, DISLOCATIONS AND SPRAINS
1300 pages, 1300 illustrations (1946). $15.00

Kleiner's HUMAN BIOCHEMISTRY
573 pages, 70 illustrations, 5 color plates (1945). $ 6.00

Sachs' THE CARE OF THE NEUROSURGICAL PATIENT
268 pages, 177 illustrations, 2 in color (1946). $ 6.00

Sadler's MODERN PSYCHIATRY
896 pages (1945). $10.00

Thewlis' CARE OF THE AGED (Geriatrics)—5th Edition
504 pages, 56 illustrations (1946). $ 8.00

Willius and Keys' CARDIAC CLASSICS—A Collection of Classic Contributions on the Heart and Circulation
846 pages, illustrated. $10.00



The **C. V. MOSBY** *Company*

SAINT LOUIS • SAN FRANCISCO



THE ISOLETTE*

NEW CHAPPLE INCUBATOR-ISOLATION UNIT

Provides Every Requirement for Low Cost, Efficient Care of Premature Infants and Others Up to 6 Months

1. Filtered fresh outside air circulated at slight positive pressure in closed plastic dome eliminates droplet and air-borne infection.
2. Temperature, humidity and oxygen concentration are controlled at will.
3. Contact with infant is reduced to scrubbed hands of doctor or nurse inserted through plastic sleeves. Closed sleeves are available.
4. Infected and non-infected patients may be placed on same ward.
5. Masks and gowns are unnecessary.
6. Hospital personnel work in normal temperatures and humidity.

Prices and complete details on request.

he Isolette* is manufactured under license
'om Children's Hospital of Philadelphia by

*Trade-mark

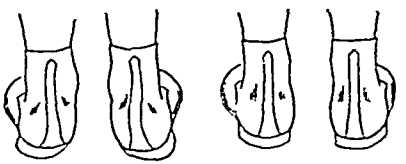
AIR-SHIELDS, INC.

HATBORO, PA. (Metropolitan Philadelphia)

Doing a shoe man's part to help you

Correct Pronation

Stride-Rite builds a special shoe to help you correct pronation — as much as the shoe man can do. An eighth-inch wedge is built in on the inner border of all heels, providing a sound foundation for any further adjustments that you find necessary. This operation is entrusted only to experienced shoe craftsmen and based on construction theories offered by leading Orthopedic men.





GREEN SHOE MFG. CO., BOSTON, MASS.

THE STRIDE RITE SHOE

FROM TOTS TO TEENS

PERIODICI SCIENTIFICI CAPPELLI, BOLOGNA

Ciascun Volume in abbonamento per l'Italia L. 800—Estero L. 1500

ANNALI ITALIANI DI CHIRURGIA
Diretto da R. Paolucci, A. M. Dogliotti, F. P. Tinozzi.

ANNALI DI RADIOLOGIA DIAGNOSTICA
Diretto da A. Rossi.

ARCHIVIO ITALIANO DI ANATOMIA E ISTOLOGIA PATOLOGICA
Diretto da A Busnco

ARCHIVIO ITALIANO DI CHIRURGIA
Diretto da R Paolucci, C. M. Fasiani, G. G Forni, G Fedeli

ARCHIVIO ITALIANO DI DERMATOLOGIA, SIFILOGRAFIA E VENEREOLOGIA
Diretto dai Proff G Falchi, F. Flarer, L Martinotti, E G Scolari.

ARCHIVIO ITALIANO DELLE MALATTIE DELL' APPARATO DIGERENTE
Diretto da C Frugoni, G M. Fasiani, E. Milani.

ARCHIVIO ITALIANO DI PEDIATRIA E PUERICOLTURA
Diretto da G Frontali

ARCHIVIO DI ORTOPEDIA
Diretto da A Poli.

ARCHIVIO ITALIANO DI UROLOGIA
Diretto da L. Pisani.

ARCHIVIO DI PATOLOGIA E CLINICA MEDICA
Diretto da A. Gasbarrini, D. Cesa Bianchi, A. Dalla Volta, G. Sotgiu, L. Villa.

ARCHIVIO DI SCIENZE BIOLOGICHE
Diretto da G Bergami, G. Quagliariello S Visco

BOLLETTINO DI OCULISTICA
Diretto da V. Cavara

LA CLINICA
Diretta da R. Paolucci, A. Gasbarrini.

ENDOCRINOLOGIA E SCIENZA DELLA COSTITUZIONE
Diretto da A Gasbarrini, N. Pende.

L'OTO-RINO-LARINGOLOGIA ITALIANA
Diretto da P. Caliceti.

RIVISTA ITALIANA DI GINECOLOGIA
Diretta da G Aymerich, L Bacialli, C. Decio, G Paroli, S Scaglione.

Ciascun Volume in abbonamentoper l'Italia L. 1000—Estero L. 1800
CHIRURGIA DEGLI ORGANI DI MOVIMENTO
Diretto da F. Delitala

Just Released

A New Mosby  *Publication*

INFANT NUTRITION

by PHILIP C. JEANS, M.D., Professor of Pediatrics, College of Medicine, State University of Iowa, and the late WILLIAM McKIM MARRIOTT, M.D., Professor of Pediatrics, Washington University School of Medicine.

After a lapse of several years, this popular text returns to the Mosby list in a new, completely modern Fourth Edition.

Dr. Jeans has revised the text thoroughly—overlooking none of the great strides made in the field of nutrition since publication of the last edition.

Changes and additions have been made in relation to Development; Minerals; the Vitamins and Infant Diseases. There is a comparative analysis of human and cows' milk, with discussion of artificial feeding.

495 Pages 36 Illustrations Price $6.50

The C. V. MOSBY *Company*

SAINT LOUIS SAN FRANCISCO

New! **AN ENGLISH BOOK**

For American Distribution

DISEASES of CHILDREN'S EYES

by

JAMES HAMILTON DOGGART. Ophthalmic Surgeon, Hospital for Sick Children, Great Ormond Street, London; Surgeon and late Research Scholar, Royal London Ophthalmic Hospital.

258 pages, 210 illustrations, including 32 color plates. PRICE, $10.00.

After giving some sound, sensible advice about the care and examination of children's eyes, this new book gives a section of anatomy of the orbit, then discusses the eyeball, the eyelids, conjunctiva, etc. Excellent illustrations appear in these sections.

Separate chapters are written on the Visual Pathway; Development of the Eye; Congenital Abnormalities; Ocular Complications. Then treatment is taken up; with separate sections on injuries of the eyeball; diseases of the orbit; refraction; squint; lacrimal disorders; and the varied diseases associated with the eye. Every chapter is well illustrated, with both black and white and colored illustrations appearing in profusion.

This book will have a strong appeal if you are an Ophthalmologist, a Pediatrician or General Practitioner—for after all, it is the General Practitioner who is first consulted in children's cases.

THE C. V. MOSBY COMPANY MJ.
3207 Washington Blvd.
St. Louis 3, Missouri

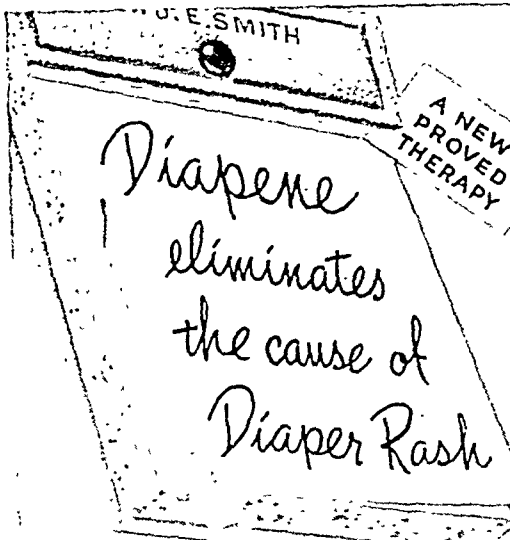
Gentlemen: Please send me a copy of Doggart's

DISEASES OF CHILDREN'S EYES.
The Price is $10.00

_____ Enclosed is check.
_____ Charge my account

Name _____

Address _____



"MEDICATES THE DIAPER"

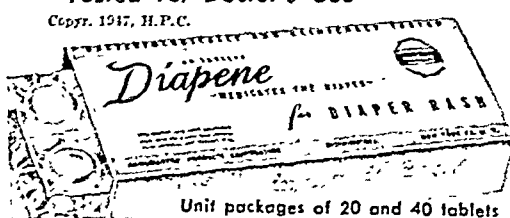
The cause of *ammonia dermatitis* is ammonia liberated by bacterial decomposition of urinary urea. DIAPENE — impregnated into the laundered diaper merely by rinsing — checks the particular bacillus which releases ammonia from the baby's urine. DIAPENE, therefore, prevents and relieves diaper rash by eliminating the cause.

IMPORTANT:—DIAPENE is as basically necessary as baby oil, powder or ointment, because chafing, prickly heat, allergy *rashes, etc.,* are often aggravated by ammoniacal urine. DIAPENE is a prophylactic MUST for every baby!

For prevention, medicate only "night" diapers. For treatment, medicate all the diapers. One tablet to 2 qts. water, a rinse for 6 diapers.

Bacteriologically and Clinically Tested for Doctor's Use —

Copyr. 1947, H.P.C.



Unit packages of 20 and 40 tablets

HOMEMAKERS' PRODUCTS CORPORATION
380 Second Ave., New York 10, N. Y.

Please send me, without cost, literature and samples of DIAPENE to eliminate cause of diaper rash *(ammonia dermatitis).*

Dr. _____

Address _____

City _____ *Zone* _____ *State* _____

I average _____ diaper rash cases weekly.



A New Mosby Book!

Clendening & Hashinger's

METHODS *of* DIAGNOSIS

A New, Completely Practical Work for
"the Physician at the Bedside of the Patient"

By LOGAN CLENDENING, M. D., F. A. C. P., Late Professor of Clinical Medicine and History of Medicine; and WARD H. HASHINGER, M. D., F. A. C. P., Professor of Clinical Medicine, both of the University of Kansas School of Medicine

1064 Pages, 125 Illustrations • Price $12.50

THIS book has been prepared with YOU in mind—you, at the bedside of your patient, analyzing the patient's story, noting symptoms and signs, and finally interpreting laboratory findings. On that basis, METHODS OF DIAGNOSIS covers all the diagnostic possibilities of a given case.

First, the basic principles of diagnosis are set forth. Then complete sections are devoted to the basic entities in diagnosis: symptoms, physical signs, and interpretation of laboratory findings. The authors cover the significance of specific symptoms. They go over the body as a whole—and examine each symptom and part of the body. Finally, they discuss and evaluate the findings of laboratory and special procedures.

The contents of METHODS OF DIAGNOSIS are based on more than twenty-five years of bedside teaching of physical diagnosis. The enjoyable and vivid Clendening style puts this book in class of thoughtful literature as well as scientific publication—both pleasantly readable and highly informative.

Order Form

THE C. V. MOSBY COMPANY
3207 Washington Blvd.
St. Louis 3, Missouri

Gentlemen: Please send me a copy of the new Clendening-Hashinger METHODS OF DIAGNOSIS, $12.50.

☐ Attached is my check ☐ Charge my account

Name_____

Address_____

A basic text on the subject

CHILD CARE and TRAINING

by Marion L. Faegre & John E. Anderson

"Recommended enthusiastically and without reservation."—*New England Journal of Medicine.*

"No important aspect of child development and care is omitted. The treatment is scientific without being too technical."—*Journal of Education. 7th revised edition, $3.25.*

"A perfect book for parents"
—*Journal A.M.A.*

LET'S TALK ABOUT YOUR BABY

by H. Kent Tenney, Jr., M.D.
Fellow of the American Academy of Pediatrics

A sound, authoritative book to recommend to new mothers. Originally prepared for his own patients by one of America's most distinguished pediatricians. *$1.50*

At all bookstores
The University of Minnesota Press
Minneapolis 14

New Fourth Edition

Zahorsky's Synopsis of

PEDIATRICS

By JOHN ZAHORSKY, A.B., M.D., F.A.C.P., Professor of Pediatrics and Director of the Department of Pediatrics, St. Louis University School of Medicine; assisted by T. S. ZAHORSKY, B.S., M.D., Instructor in Pediatrics, St. Louis University School of Medicine. 431 pages, 144 illustrations. PRICE, $4.50.

Recent rapid progress in pediatrics, particularly in the fields of prophylaxis and treatment, has necessitated another revision of this popular Synopsis Volume. The authors have revised carefully, changing prophylactic administrations of serums and vaccines in accord with increased experience. In relation to sulfonamide therapy, they have deleted and substituted in the section on therapeutic practices. As regards vitamins, they have selected only those measures which are based on clinical observations.—*The C. V. Mosby Co., Publishers, St. Louis 3, Mo.*



Dennison DIAPER LINERS

Physicians and nurses have found that Dennison Diaper Liners make the diaper problem simpler and easier for new mothers. Physicians and nurses recommend Diaper Liners because they are sanitary, and so soft next to baby's tender skin that they help prevent chafing and help guard against diaper rash.

Diaper Liners make diaper washing much less disagreeable. Hours of hard scrubbing are eliminated. The Liner is simply folded inside diaper. When soiled, the Liner is flushed away. Quick, simple, easy!

Suggest Dennison Diaper Liners to new mothers, and to your hospital, too. The cost is only a few cents a day.

DELUXE: 180 for $1.00—Cradle Time & Downeesoft: 180 for 69c

DENNISON, Dept. Z 214
Framingham, Mass.

FREE Please send me a whole day's supply of Dennison Diaper Liners.

Name.....

Street.....

City Zone State.....



R One pair of Self-Starters

MOTHERS WILL THANK YOU FOR THIS ADVICE...

Mothers are always grateful for advice which will contribute to the welfare of their children. This is especially true when it comes to the problem of selecting the proper shoes during that important period of development *... from start to six years old.* Self-Starters, because of their scientific design and construction provide "Protected Foot Freedom" throughout this period.

CARPENTER SHOE CO., ROCHESTER, N. Y.

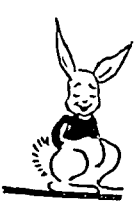
Self-Starters
FROM START TO SIX YEARS OLD



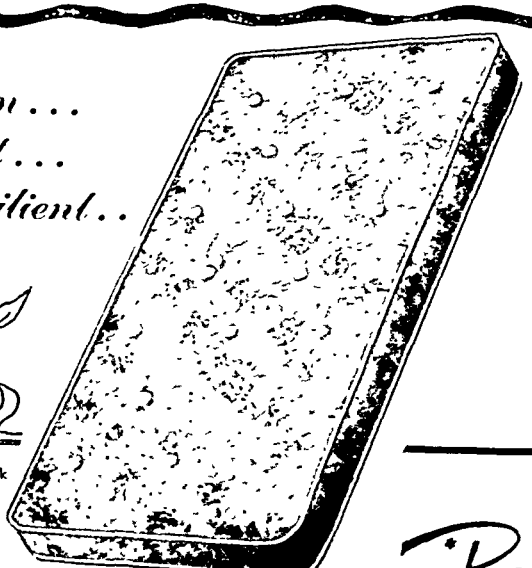
NEVAWET*

Crib Mattress

Firm...
Flat...
Resilient..



*Trade Mark



- fully interwoven, tempered steel innerspring... rigid border wire, top and bottom
- all new cotton felt filling
- Surfacoted* for resistance to water, oil and uric acid
- Cova-tufted* for protecting baby against bare buttons
- Attractive cover designs
- Superior workmanship

Bunny Bear
EVERETT, MASS.

Announcing the availability of PERTUSSIS IMMUNE SERUM (*human*) IN VACUUM DRIED FORM

Once again we have Pertussis Immune Serum (human) *in the preferred* vacuum dried form. *Orders from physicians anywhere filled quickly. 24-hour service to handle telegraph orders. For literature and full information, write to:*

The **PHILADELPHIA SERUM EXCHANGE**

A NON-PROFIT ORGANIZATION

1740 Bainbridge Street
Philadelphia 46, Pa.

See the improved Hygeia Nursing Unit

- **Easy to clean.**
- **Fewer parts to handle—just bottle, nipple and cap.**
- **When bottles are filled, only necessary to remove cap at feeding time.**
- ***Sterilized cap makes handy container for baby's other foods.***

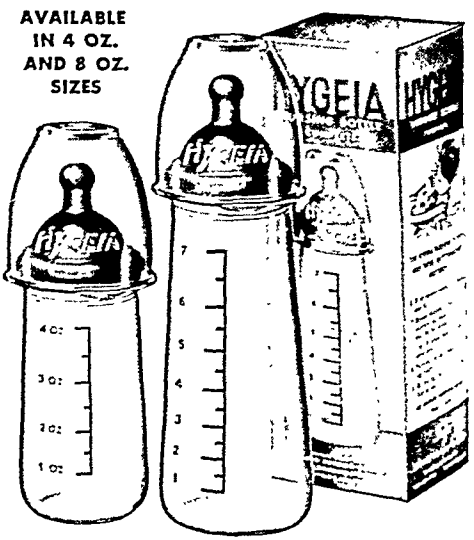
CAP . . . Keeps nipple germ-free for storing or out-of-home feeding. Sterilized cap may be used for orange juice, cereals, etc.

NIPPLE . . . Famous breast-shaped nipple has a patented airvent to insure steady flow of formula and reduce "wind-sucking." Sanitary tab keeps nipple sterile when applying. *Not necessary to touch feeding surfaces of nipple.*

BOTTLE . . . Wide mouth—easy to clean—no funnel required for filling. Red measuring scale easy to read. Tapered shape makes it easier for baby to hold.

Sample free to doctors on request.
Sold by druggists everywhere.
Hygeia Nursing Bottle Co., Inc.
1210 Main St., Buffalo 9, N. Y.

AVAILABLE IN 4 OZ. AND 8 OZ. SIZES



All Hygeia national ads say:
"CONSULT YOUR DOCTOR REGULARLY"

HYGEIA NURSING BOTTLES NIPPLES WITH CAPS
Sold complete as illustrated, or parts separately

SYNOPSIS SERIES

These are the special MOSBY contributions to the world of medicine. Noted for their brevity and economy—without any sacrifice of essentials—each one is a gift of utility and excellence.

Alexander's Synopsis of ALLERGY—2nd Edition
255 pages, 22 illustrations (1947).....$ 4.00

Anderson's Synopsis of PATHOLOGY—2nd Edition
741 pages, 327 illustrations, 15 color plates (1946) $ 7.50

Bray's Synopsis of CLINICAL LABORATORY METHODS—3rd Edition
496 pages, 93 illustrations, 20 color plates (1944)..$ 6.00

Crossen's Synopsis of GYNECOLOGY—3rd Edition
256 pages, illustrated (1946).....$ 4.00

Davison's Synopsis of MATERIA MEDICA, TOXICOLOGY AND PHARMACOLOGY—3rd Edition
766 pages, 40 illustrations, 4 color plates (1944)..$ 7.50

Dodson's Synopsis of GENITOURINARY DISEASES—4th Edition
313 pages, 112 illustrations (1945).....$ 4.00

Hardy's Synopsis of DIAGNOSIS OF SURGICAL DISEASES OF THE ABDOMEN—2nd Edition
526 pages, 100 illustrations (1945).....$ 5.50

Hermann's Synopsis of DISEASES OF THE HEART AND ARTERIES—3rd Edition
516 pages, 103 illustrations, 4 color plates (1944)..$ 6.00

Hirschman's Synopsis of ANO-RECTAL DISEASES—2nd Edition
315 pages, 182 illustrations, 12 color plates (1942).$ 5.00

Howles' Synopsis of CLINICAL SYPHILIS
609 pages, 121 illustrations, 2 color plates (1943).$ 6.50

Litzenberg's Synopsis of OBSTETRICS—3rd Edition
416 pages, 157 illustrations (1947).....$ 5.50

Main's Synopsis of PHYSIOLOGY
341 pages, illustrated (1946).....$ 4.50

Mobley's Synopsis of OPERATIVE SURGERY—2nd Edition
416 pages, 383 illustrations, 37 in color (1947)...$ 6.00

Selling's Synopsis of NEUROPSYCHIATRY
561 pages, 27 illustrations, 1 color plate.....$ 6.50

Sutton's Synopsis of DISEASES OF THE SKIN
475 pages, 413 illustrations (1942).....$ 6.00

To Order, USE COUPON BELOW! If a Gift Order, be sure to include your name and name of recipient. A gift card will be enclosed.

The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo. MJ12-47

I would like the following book(s):

_____ _____

_____ _____

_____ _____

sent to me_____ (name) at_____ (address)

sent to_____ (name) at_____ (address)

as a gift with gift card enclosed with my name.

☐ Enclosed is my check ☐ Charge my account

You Should Subscribe Now for These Special Journals

American Journal of Obstetrics and Gynecology

Representing The American Gynecological Society, The American Association of Obstetricians, Gynecologists and Abdominal Surgeons, and nine other societies. Editor: Geo. W. Kosmak, M.D.; Associate Editors: Howard C. Taylor, Jr., M.D., and Wm. J. Dieckmann, M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $12.00; Canada, and other Foreign Countries, $13.00 a year.

The Journal of Pediatrics

Borden S. Veeder, M.D., Editor.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

The Journal of Laboratory and Clinical Medicine

Official Publication of the Central Society for Clinical Research. Carl V. Moore, M.D., Editor. Board of Editors: Edgar V. Allen, M.D.; M. A. Blankenhorn, M.D.; George E. Burch, Jr., M.D.; Paul R. Cannon, M.D.; Jerome E. Conn, M.D.; Charles A. Doan, M.D.; Edgar S. Gordon, M.D.; Irvine H. Page, M.D.; Armand J. Quick, M.D.; Wesley W. Spink, M.D.; Cecil J. Watson, Ph.D., M.D.; Arnold D. Welch, Ph.D.; W. Barry Wood, Jr., M.D.

Published monthly. Subscription rates: Domestic and for the Pan-American Countries, $8.50; Canada, and other Foreign Countries, $9.50 a year.

American Journal of Syphilis, Gonorrhea and Venereal Diseases

J. E. Moore, M.D., Editor. Frank W. Reynolds, M.D., Associate Editor. Advisory Editorial Board: A. M. Chesney, M.D.; C. W. Clarke, M.D.; R. D. Herrold, M.D.; E. L. Keyes, M.D.; P. A. O'Leary, M.D.; T. Parran, M.D.; P. S. Pelouze, M.D.; J. H. Stokes, M.D.; R. A. Vonderlehr, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

The Journal of Thoracic Surgery

Representing The American Association for Thoracic Surgery. E. A. Graham, M.D., Editor; Brian Blades, M.D., and Richard H. Mead, Jr., M.D., Associate Editors.

Advisory Editorial Board: John Alexander, M.D.; Edward Wm. Archibald, M.D.; Edward D. Churchill, M.D.; Leo Eloesser, M.D.; Stuart W. Harrington, M.D.; Howard Lilienthal, M.D.; Rudolph Matas, M.D.

Published bimonthly. Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $10.50 a year.

American Heart Journal

A Journal for the study of circulation. Published monthly under the editorial direction of The American Heart Association. Editor-in-Chief, Thomas M. McMillan, M.D.; Associate Editors: Wallace M. Yater, M.D., Samuel Bellet, M.D., Louis Laplace, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $10.00; Canada, and other Foreign Countries, $11.00 a year.

The Journal of Allergy

Official Organ of The American Academy of Allergy. H. L. Alexander, M.D., Editor. Editorial Board: M. M. Albert, M.D.; J. H. Black, M.D.; M. B. Cohen, M.D.; R. A. Cooke, M.D.; S. M. Feinberg, M.D.; S. B. Hooker, M.D.; F. C. Lowell, M.D.; F. M. Rackemann, M.D.; W. B. Sherman, M.D.; F. A. Simon, M.D.; M. B. Sulzberger, M.D.; L. Tuft, M.D.; M. Walzer, M.D.

Subscription rates: Domestic and for the Pan-American Countries, $7.50; Canada, and other Foreign Countries, $8.00 a year.

Surgery

Alton Ochsner, M.D., and Owen H. Wangensteen, M.D., Editors. Alfred Blalock, M.D., Associate Editor. Published monthly. Subscription rates: Domestic, $10; Canada, and other Foreign Countries, $11 a year.

☞ Enter your subscriptions to these important special journals today. If you prefer we shall be glad to send a sample copy.

THE C. V. MOSBY COMPANY — *Publishers* — St. Louis